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by the
AMERICAN FARM ECONOMIC ASSOCIATION
1950

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(August issue)

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JOURNAL OF FARM ECONOMICS

NOVEMBER, 1950, PART 2

Strategic Approaches to Southern Progress ..... *Robert D. Calkins* 697
Economic Prospects of the South ..... *George H. Aull* 709
Dynamics of Farm Adjustments in the South ..... *Charles R. Sayre* 721
Discussion ..... *Russell W. Bierman* 735
Discussion ..... *Roy E. Proctor* 736
Cotton Price Policy in Relation to the Domestic Market .... *M. K. Horne, Jr.* 738
Cotton Labor Requirements ..... *Frank J. Welch and D. Gray Miley* 752
World Prospects in Cotton ..... *E. D. White* 759
Discussion ..... *Ben T. Lanham, Jr.* 770
Over-All Adjustment in Southern Agriculture ..... *E. L. Langsford* 773
Discussion ..... *Carl W. Allen* 786
Adjustment Problems in Midwest Agriculture ..... *J. Carroll Bottum* 788
Discussion ..... *J. E. Wills* 799
World Trade and American Agriculture ..... *Howard R. Tolley* 801
Agriculture and the Conditions of Postwar Trading ..... *Lawrence W. Witt* 814
Coming Developments in Agricultural Policy ..... *D. Gale Johnson* 827
Development of Agricultural Policy ..... *Arnold Brekke* 839
Discussion ..... *Frederick V. Waugh* 856
Agricultural Statistics as an Aid to Research, Service, and Administration .. .. *Oris V. Wells* 858
Current Frontiers in Farm Price Data ..... *B. R. Stauber* 865
Discussion ..... *Henry M. Taylor* 877
Discussion ..... *Don Paarlberg* 879
Trends in the Consumption of Tobacco Products, United States, 1900–1950 ..... *Elmo L. Jackson* 881
Government Programs in Tobacco ..... *R. C. Austin* 894
Some Aspects of Research in the Marketing of Tobacco Leaf .. *Lee R. Martin* 907
Discussion ..... *Arthur G. Conover* 923
Discussion ..... *Charles E. Gage* 924
The Impact of Commodity Credit Corporation Operations on Farm Market Prices and Market Channels ..... *O. C. Stine* 931
Impact of CCC Operations upon Marketing Agencies ..... *C. C. Farrington* 943
Discussion ..... *Geoffrey Shepherd* 954
Discussion ..... *Willard W. Cochrane* 955
The Role of Market News in Marketing and Some Problems ..... *Kenneth J. McCallister* 958
The Influence of the Federal Food and Drug Administration in Marketing ..... *E. W. Gaumnitz* 969
Central Market Quotations and Country Buying ..... *Hugh L. Cook* 975
Discussion ..... *Herman M. Southworth* 988
Discussion ..... *A. G. Mathis* 988
Impact of Marketing Agreements and Orders on the Marketing of Milk ... . *Leland Spencer* 992
The Impact of Marketing Agreements upon the Marketing of Fruits and Vegetables ..... *Floyd F. Hedlund* 1006
Discussion ..... *John B. Roberts* 1015
Discussion ..... *H. G. Hamilton* 1016
Trends in Cooperative Expansion 1900–1950 ..... *H. E. Erdman* 1019
Cooperative Expansion Through Horizontal Integration .. *Joseph G. Knapp* 1031
Vertical Integration of Agricultural Cooperatives ..... *E. Fred Koller* 1048
Discussion ..... *Werner Z. Hirsch* 1058
Discussion ..... *E. A. Perregaux* 1060
Discussion ..... *Frank Robotka* 1062
Land Economics Research in Retrospect and Prospect ..... *E. H. Wiecking* 1064
The Landlord-Tenant Relationship Program in North Carolina 1076

Background of Program ..... *J. C. Powell* 1076
How It Was Started: Objectives, Situations, and Difficulties Encountered ..... *Eugenia P. VanLandingham* 1080
Procedure for One Year of Work ..... *Robert L. Hendrix* 1085
Extension Methods Used to Accomplish the Job ..... *Nancy W. Lewis* 1087
Progress Made by Croppers Participating in the Program ..... *W. L. Turner* 1090
Appraisal of the Program ..... *C. B. Ratchford* 1093
Discussion ..... *Luke Schruben* 1099
The Application of Static Economic Theory to Farm Management Problems ..... *Irving F. Fellows* 1100
Limitations of Static Economic Theory in Farm Management Analysis .... *H. B. James* 1113
Discussion ..... *S. A. Engene* 1120
Discussion ..... *L. C. Cunningham* 1121
Discussion ..... *R. E. L. Greene* 1122
Application of Recent Economic Theory in Agricultural Production Economics ..... *Earl O. Heady* 1125
Needed Developments in Economic Theory as Applied to Farm Management ..... *Glenn L. Johnson* 1140
Discussion ..... *C. B. Haver* 1156
Relation of Economic Theory to the Analysis of Empirical Data in Farm Management Research ..... *Kenneth L. Bachman* 1159
Some Problems of Joint Use of Theory and Empirical Data in Farm Management Research ..... *Ernest J. Nesius* 1169
Some Fundamentals of Conservation Economics and Policy ..... *Earl O. Heady* 1182
Proceedings of Executive Committee Meeting, American Farm Economic Association, Montreat, North Carolina, August 28, 1950 1196
Minutes of the Annual Business Meeting 1197
Report of the Marketing Committee 1197
Report of the Election Tellers 1198
Report of the President 1199
Report of the Editor 1201
Report of the Secretary-Treasurer 1201
Proceedings of Executive Committee Meeting, American Farm Economic Association, Montreat, North Carolina, August 30, 1950 1205
Index to Volume XXXII 1207

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STRATEGIC APPROACHES TO SOUTHERN PROGRESS

ROBERT D. CALKINS, Director
General Education Board

EVERY region of this country has its own distinctive features and its own special problems. Despite the leveling influences of migration and standardization, there happily remain in each region not only the ineffaceable peculiarities of history and terrain, but also distinctive features of economic life, of people, of manners and customs and behavior. So, likewise, each region has its peculiar achievements and its failures, its ambitions and its inertia, its paradoxes of progress and backwardness, of wealth and poverty, of social health and social ills. In the possession of such distinctions the South is similar to other regions.

The distinctions that are notably southern are for the most part inherited from the past. More than the Northeast, or the newer Midwest, or the Far West, the South has been bequeathed the unsettled problems of earlier generations. From this legacy the South has suffered economic handicaps such as the rest of the country has never known. It has inherited problems of racial adjustment which in scope and complexity are unique in the whole land. The educational, social, and political systems bear the distinctive marks of this inheritance. From among its other legacies the South has acquired a way of life, flavored with the manners and courtesies and diversions of a more courtly era now all but vanished save in the memory of the dwindling few. The distinguishing marks of the South have been fastened upon for glorification, caricature, and ridicule; but these parodies, however popular, do not represent or typify the modern South, the South that you see today. They are,

to use the phrase of an Englishman, "as remarkable for their detachment from fact as for their folly."

The problems of the South have been variously described as economic and political, social and racial, educational and cultural. They are all of these—and more. They encompass more than the problems of distress and deprivation. They are far more than the problems of patching and repairing defective parts of a social machine. They are in fact the problems of bringing the South into its own—of bringing it into its own, first of all for the benefit of the southern people themselves, and secondly for the benefit of the entire nation. The task of southern development is not to be regarded merely as that of lifting the conditions of life for the great mass of the southern people to the levels enjoyed elsewhere. It must be looked upon as the task of so releasing and developing the potentialities of the southern states and of the southern people that they may take their full place in the economic, political, and cultural life of the nation, and there make the full contribution of which they are potentially capable. No lesser goal will for long stand acceptable either to the South or to those who have the greatest well-being of the nation at heart.

In the course of recent generations, the South has fought a lonely battle to meet its pressing needs of the moment and to advance toward its ultimate goal. It has made remarkable progress with limited resources. Economics is sometimes referred to as the science of allocating scarce means to unlimited wants. I can assure you that the South has had experience in the lower register of that scale. What the South has needed is a science by which it could apply future means to present wants. For the South has had to inch itself along, never able to provide adequately for its current requirements or to finance adequately its own future. Yet with persistence over the years it has, by a ratcheting process, moved forward on all fronts.

The diversified character of this effort is worth noting, for it is a case study in regional development. Among the early undertakings were those designed to eradicate disease, to improve health and nutrition, and generally to improve the physical well-being of people so that they might become more useful citizens. Simultaneously, better schools were provided so that children might be given better education and might acquire greater competence for self-improvement and community improvement. Demonstration farms,

improved seed, and better farming practices were introduced and encouraged so that agriculture, the principal source of livelihood, might yield larger returns and thus broaden the economic base for the support of still further improvements. Investments in transportation, highways, and power systems opened opportunities for industrial development, creating more productive forms of employment. A people that had been largely agricultural gradually acquired the knowledge and skills that allowed them to shift into other pursuits, the economy diversified and grew, health and education were further improved, and southern life was broadened and enriched. Each stage of development facilitated the next and often financed it. Mass programs designed to yield quick returns by enlisting the cooperation of large numbers of people were rare and too expensive to be prosecuted. Instead, improvements were generally started on a small scale as demonstrations here and there at vital points, and, as their effectiveness was shown, they were copied and spread. Advances in one field, health or invention for example, time and time again removed obstructions, thus allowing advances in other fields to proceed. Every new development ushered in new problems, new bottlenecks, new needs; and, as these were disposed of, others sprang up in some other quarter. Delays, inertia, and other impediments arose to retard the advance, and often when mobilized knowledge and incisive action would have yielded incalculable benefits. But it is nevertheless remarkable that such a complicated process should have moved forward so well and should have accomplished so much with such modest support and so little coordination of effort. It is an interesting example of how our voluntary system operates without central authority and direction; and it is incidentally an example that has never been adequately studied.

When one considers what has been done in this region, and sees the current evidences of progress, he is aware that a new spirit is abroad in the South. Here one will find that agriculture is being turned from a poverty-ridden one-crop system into the promising avenues of diversified farming, mechanization, and scientific cultivation. Here one will find modern factories and power developments, highways and public buildings, great urban centers and home sites, like those of any other region. Understandably the South takes pride in what it has achieved.

It is no reflection on that achievement to recognize that these

developments, encouraging though they are, are not enough. They represent a healthy beginning, but only the beginning, in a long struggle that lies ahead. In the economic sphere, for example, the 15 Southern States since 1930 have succeeded in raising their per capita income from 45 percent of the average income in the other 33 states to 65 percent of that income, and this has been done while the income base outside the South has doubled. But with this gain the South cannot relax its efforts. At these recent rates of advance another 35 or 40 years will elapse before southern incomes can be brought up merely to the average prevailing elsewhere in the country. There is no assurance that these rates of advance can be maintained to produce that result. The amount of deliberate effort now being made for the development of the South will do hardly more than maintain the existing momentum. If the rate of advance is to be accelerated, as I confidently believe it can, special efforts must be made at every promising point of attack. It is with these deliberate efforts to encourage, facilitate, and stimulate economic improvement that we are here concerned.

Strategic Approaches

It is an astonishing fact that we know comparatively little about the techniques by which the overall development of a region can be encouraged. This is a singular situation in view of the voluminous verbiage on economic and social improvement; and it is the more astonishing in light of the fact that in 343 years of English settlement on this continent we have been preoccupied with just this enterprise and have been more successful at it than any other people in the history of the world. From the first adventures in settlement down to the latest investment for the future, we have been promoting a better life for our people. We have learned a lot about it in specialized fields, and yet we know very little about it in any formal and overall sense.

I do not mean that we have not had ideas about how to promote human welfare. Following 1776 we had, and in large measure followed, Adam Smith's philosophy of economic development, comprehending the notion that human welfare could best be promoted by leaving people free to seek their own self-interest. But we have never followed this idea literally. We have always been ready to use public policy to foster one type of development and to discourage another, to stir people to one course of action and to deter

them from another. The history of our land policy is an example. Later we authorized government to provide public services in a growing number of fields, not just for the handicapped who were thought to deserve public assistance, but for the benefit of the ordinary citizen as well; education, health, hospitals, social security are examples. Moreover, we introduced special services to assist the development of particular industries, and of this, agriculture affords a good illustration. Later the idea, or possibly the cult, of planning arose, with the professed intention of shaping the course of development for the benefit of the people. Apart from such general conceptions, we have had others in countless projects and proposals for human betterment in almost every department of life. Yet in spite of all this, as I have said, we still know comparatively little about how a people may deliberately develop a region so as to lift the whole level of life onto a higher plane, and we know even less about how to induce people to prosecute such a development.

In our form of society the real work of developing a region is prosecuted by countless people, for countless ends, and for countless reasons. Motivations of personal gain, of public service, of acclaim and esteem, of personal or community achievement, and the privilege of taking pride all have their part. Individuals, private groups, and public agencies all participate in this effort to create a better future. Arouse the aspiration to build a better life and somehow, through the vision and enterprise of these persons, this group, or that agency, we thrust forward here and pull up our forces there, remove some serious obstruction, open a new field of opportunity, stir the ambition and the will of people, attempt this expedient or that program, introduce a discovery here and an invention there, and press on to higher and higher goals. How is it done? Or better still, how can we do it deliberately, either from within, or with stimulation from without? Many agencies can tell us how it has been done in their own small sectors, and some can tell us how to do it in their own provinces; they can tell us how to do it, that is, until the effort bogs down because of some failure to make progress in another field. But apart from these fragmentary views we know little. The overall strategy and techniques lie buried in a vast sea of experience still unfathomed.

Yet in that sea there is certainly the technique which I shall call the strategic approach. It is one of the most common techniques and, properly used, one of the most effective. In essence it repre-

sents an attack at critical or strategic points, where with limited assistance, intelligently applied, a break through can be made that will unleash larger forces for important gains on a broad front. Removing bottlenecks and overcoming obstructions that block the path of normal efforts are simple illustrations. But the strategic approach may also include the farsighted prevention of bottlenecks and obstructions so that costly delays may later be avoided. Of even greater importance is the discovery and introduction of improvements that, by enlarging opportunities, or creating new ones, permit sweeping advances that hasten progress on many fronts. Such innovations produce a sort of chain reaction that yields results out of all proportion to the initial effort. In considerable part the strategic approach is the method of intelligently helping others to help themselves.

Economic Conditions—a Point of Attack

From the over-all point of view, economic improvement in the South represents a strategic approach, since by raising the conditions of work and living for the great mass of people, many of their other needs can be met, some of their other social problems can be alleviated, and the solution of still others can be assisted. Economic improvement is no cure-all, but it does give leverage with which to pry out many obstructions; it lifts the aspirations of people, and it helps them to afford the conveniences and comforts and enjoyments of life. Let us turn then to economic improvement and more especially to strategic approaches in agriculture.

I take it that before a group of economists no demonstration is required to show that increased productivity is the one avenue to economic improvement. As I have often expressed it, the South needs to substitute skill for sweat, brains for brawn, and technology for the good right arm. The hope of the South lies, on the one hand, in making existing occupations more productive through the use of more capital and power, better methods, better products, and better management; and on the other hand, it lies in creating new industries that will allow great numbers of workers to shift from less productive into more productive forms of employment. The South has a much larger fraction of unskilled and semi-skilled workers in its labor force than any other section of the country. This great mass of low-producing, low-earning workers has become

a burden on the back of the South; it has become a drag and not an aid to southern progress. No widespread prosperity will exist, or can exist, in this region until most of these people are shifted into more productive pursuits. This problem is well illustrated in the question put recently by a business man: "How can we get the Negro off our backs and make him self-supporting?" To which the reply given is the only reply: "We can get him off our backs by making him productive—by training him, and by so mobilizing knowledge, and capital, and technology, and management, that we can use the Negro in more productive ways—and the same applies to the unskilled of all races." The task of upgrading these workers and of making them productive is the great social task of the southern business man, of the southern farmer, and of the public leaders, who alone can do for these people what they alone cannot do for themselves. That is the challenge confronting the economic statesmanship of the South.

If one analyzes the per capita incomes of the South, and this has by no means been adequately done, the source of the trouble is partially revealed. The low earners, it will be found, exist mainly in rural areas and among Negroes both urban and rural. White urban dwellers in a good many southern cities enjoy incomes not significantly below those obtaining in comparable cities outside the South. The diagnosis needs to be carried further, but it is clear that southern agriculture is one important segment of the economy where improvement is urgently needed. From other evidence it is likewise clear that the improvement of agriculture will call for fewer and better farmers; the city-ward migration from the farms will continue; and because of it the farm problem will become more amenable than otherwise it would be. But this migration to the cities will merely shift the centers of distress unless southern leadership can rapidly promote industry and urban occupations for the growing numbers of urban dwellers. But there is reasonable hope that the adjustment can be made. The South in 1940 was no more urban than the rest of the country was in 1880. The South's urban growth has been delayed. The rate of industrial progress in the past decade has been sufficiently rapid as actually to draw people from the country into the cities. Without intending to deprecate the critical importance of this problem, I shall pass over it here and turn to the problems of agriculture.

Strategic Approaches in Agriculture

We come then to ask: what are some of the strategic approaches through which important improvements in agriculture may be realized? Anyone who travels through the South extensively, as I do, is struck, I think, by the contrast between the best and the average, not to say the worst, in southern agriculture. And one quickly asks: what is holding up the progress of agriculture in this region? Is it really moving forward as rapidly as it can? And the answer is that it is not.

It would be a strategic move to diagnose this problem and determine what obstructions exist and how they can be removed. Is mechanization, for example, moving forward as rapidly as it could if some impediment respecting delivery, or financing, or operating efficiency, were rectified? Great progress has been made in the control of soil erosion and in the use of cover crops and crop rotation schemes, but in vast areas of the South these practices are sparsely used. Why is this? And what steps can be taken to stimulate the introduction of these basic improvements? Are our county agents really on the job? Or is the difficulty elsewhere? Is it financing? Or ignorance? Or are the farms so uneconomic that they will not support even their own protection? To what extent are banking practices perpetuating unsound agriculture, and how can they be shaped so as to build a better agriculture and better customers as they should? I have no answers for these questions; but are the answers being sought vigorously and the remedies applied with equal zeal? Are those dealing with agriculture doing all that can be done to lift this sector of the economy to a position of strength?

The South is burdened with a great many small, ill-equipped and ill-managed farms. If larger operating units are necessary for prosperous farming, what progress is being made in the creation of these units? Is sufficient headway being made with the integration of farm operations and with farm consolidations? What trends are sound, and how can they be encouraged? I do not mean what can be said about the encouragement of desirable trends. I mean what can be done about it.

We have all heard of the farmer who wanted no information about scientific farming because, as he put it, "I ain't usin' now half of what I know." Not using what we know is a common failing in all walks of life. How in agriculture can we induce a better use

of what is known? It would be a strategic move to explore with some thoroughness how to put our backlog of existing knowledge into more effective use. Likewise, we ought to be more proficient than we are in getting a prompt introduction of new discoveries and new knowledge. The problem can be put another way: By what means can we shorten the lag between scientific discovery and widespread application? It is a matter of enormous import, and one that could mean millions of dollars to the South.

A third strategic move would be to determine whether we are getting as much as possible for the large expenditure of effort and money we are putting into the betterment of agriculture. This will not be a popular suggestion. But in a region as needy as the South, where funds are always scarce, it is waste twice compounded to spend funds without getting the benefits intended. I shall make bold to ask whether the South is really getting its money's worth for a considerable fraction of its expenditures for county agents, experiment stations, and related activities. It would be strange, indeed, if there were not large benefits yet to be had from a more incisive and effective use of the funds provided. Such gains are hard to realize, administrators and employees being as they are, but if won, they come happily at no extra cost.

"The trouble with southern agriculture," said a southern farmer recently, "is its farmers. We got too many raisin' corn and cotton 'cause they can't do nothin' else. And they can't do that neither." Certainly it is true that if the South is to have prosperous agriculture, it must have more trained and professional farmers on the land. Who is to train these people? Our agricultural colleges are contributing fewer than might be expected. If they are not to do the job, should high schools or agricultural junior colleges be equipped to do it? The need is sufficiently great and important that it should not be left to the random results of inattention. It is fascinating to contemplate what a steady flow of trained young farmers might do for southern agriculture in a generation; and it is interesting to speculate on what inroads they might make on tenant farming, one of the less happy and less promising chapters in our agricultural experience.

One of the most promising points of attack for the improvement of agriculture has been, and continues to be, innovation through research. A new hybrid, a better grade, a new product can mean millions of dollars in a few years. The South has entered the field

of research belatedly and it still spends insignificant sums on investigations that may someday have revolutionary consequences. Investigations into the genetics of grasses, of cotton, and of other crops have barely been started. The results in cross-breeding and soil science alone would seem to justify much larger sums for scientific investigation and experimentation. But unless this work is placed under the most competent direction, the waste will be great, the costs high, and the results meager. Nevertheless, in spite of its uncertainties, research constitutes one of the most hopeful attacks that can be made for the benefit of southern agriculture, and we are justified in urging that more of the vital problems and promising prospects be investigated and supported.

Another area in which strategic gains of great importance to agriculture could be made is that of distribution. The South has long labored under a disadvantage in trading with the rest of the country. That disadvantage derives not alone from the fact that the South exports raw materials and imports manufactures. That condition is changing. The South is now processing more of its raw materials, and its exports now contain substantial proportions of processed and manufactured goods.

The disadvantage comes in part from the differential in price levels between this region and the rest of the country. Two world wars have helped to narrow that differential, but for reasons that are somewhat obscure, the differential still persists. The preservation of a low price level in the South has perhaps given some advantage in the export of low-priced goods, but the corresponding low incomes in the area have made the prices of imported manufactures more burdensome. Moreover, as Taussig showed years ago, the terms of trade, or if you prefer, the bargaining advantages, generally run against the region having low prices and an insistent need to export. The reasons for the persistence of this price level remain largely unexplored, and so likewise is the question of whether an exceptional dose of inflation applied here would, in light of all the local trends, and needs, and problems, be a boon or a misfortune. If a higher price level relative to the rest of the country were found desirable for the economic position of the South, how could it be brought about? This aspect of the South's economic position deserves investigation.

But I am mainly concerned here with another source of disadvantage—the ill-developed marketing system through which many

southern products must find their outlet. It is not the adequacy of prices paid to farmers, or questions of orderly marketing that are involved so much as the failure of this system to do a really good job of promoting markets for southern products. Agriculture here is shifting into a wide range of commercial crops. For many of these crops, and especially for fruits and vegetables, there are growing markets in the region, but there are also large potential national markets. Unless I am seriously mistaken, those national markets are not now fully and vigorously exploited by the South.

The creation of agencies to merchandise southern products on a national scale, as for example California has done, could have profound effects in broadening the agricultural opportunities of this region. Such a development would require an effort to discover and serve the needs of distant markets. It would necessitate a sufficiently large volume of products to fill the channels of trade throughout the country. It would mean more processing and packaging and thus provide additional employment in the South. It would mean the maintenance of brands and standards of quality; and it would consequently encourage growers to raise those grades and products most in demand. In speaking elsewhere, I have urged that the South build a reputation for merchandise of dependable quality. But it must be confessed that we are still a long way from the standards that are attainable.

There are numerous merchandising enterprises in the South that are doing a good job on a small scale with an inconsequential supply. But the South needs more and larger enterprises of this sort, enterprises that will make southern products known and used, that will come to typify the marketing effort of the South. I could go on indefinitely elaborating this need for promotional merchandising, the need for processing, packaging, and quality control, and the need to produce more products of high quality for which a national market could be created. At all three points strategic advances of large consequence could be made, and at none of them has a large beginning yet been made.

But I must not prolong this discussion. There are throughout southern agriculture, and throughout the southern economy, innumerable places where an alert determined push could open new opportunities and set in motion forces that would lift the standard of living for a good fraction of the southern people. There have been times when many of these advances could not have been

made successfully, but now, with the progress that has already occurred in agriculture and other fields, and with the South's growing confidence in its capacity to do what others can do, the setting is favorable, and a determined drive to improve southern agriculture would have prospects of brilliant success.

In these remarks I have endeavored to give you in broad strokes some impression of the great task that lies before the South. If this discourse has seemed to our guests from other regions as a subject of no immediate concern to themselves, let me reassure them. The development of the South is of vital concern to the whole nation; and the progress of the work here, now so well started, needs your cooperation and help. If at times the rising agriculture of the South comes to compete with products of your own states, let us all keep the larger interests of the nation in the forefront and recognize that economically sound adjustments are in the overall interest of agriculture, and realize that in the end all states and the nation as a whole will be economically stronger and better off because of them. Let us remember too that in scientific and scholarly circles there is a code of conduct that puts the exchange of knowledge, the search for truth, and mutual helpfulness above the partisan rivalries of commercial competition. The problems of the South invite and deserve the best thought which they can command from all sections of the country. You will find the South calling upon you for assistance in dealing with these problems more than ever before. Moreover, you can help in other ways. The South is making encouraging progress in building up strong faculties and research groups, but for years to come it will continue to need your cooperation, your graduate training, your research, and the best personnel you can supply. In this connection I would be remiss if I did not say that, in many southern schools of agriculture, conditions are vastly better now than they were before the late war, and these schools are now earnestly in search of first-rate talent. You can help these institutions in this worthy endeavor by sending them good men, and among your rewards will be more and better-trained graduate students from this region. The problem we have considered is, of course, first of all a southern problem, and southerners must take the lead in solving it; but it is also your problem, and your help will, I am sure, be welcomed.

ECONOMIC PROSPECTS OF THE SOUTH

GEORGE H. AULL
Clemson College

JUST about the time that I was ready to put down on paper some more or less rambling and perhaps contradictory thoughts concerning "Economic Prospects of the South," the North Korean Communists opened up a full scale offensive against the Republic of Korea. Succeeding events thus far (July 15) have been such that my immediate interests have revolved more around the subject "Military Prospects of South Korea" than around the topic assigned to me. While I would not have chosen such a dramatic and tragic incident for the purpose, no other so well illustrates a fact which I wish to emphasize at the very beginning, namely, that the economic prospects of any region or of any country are inextricably interwoven with those of every other. Certainly I would not undertake an appraisal of the economic prospects of the South apart from the economic prospects of this country and of other countries. As a matter of fact, the more deeply I delve into the subject the more admiration I develop for the good judgment and sound wisdom of Calvin Hoover who, when given an opportunity to write this paper, chose rather to go to Turkey on a mission for the Economic Cooperation Administration.

There are some personal biases which need to be exposed before we get down to the more important business of the morning. I am not, I believe, a "rabid" Southerner; for me "The War" (Confederate, of course) was over long before my grandfather died a number of years ago! Nevertheless, I *believe* in the South and am somewhat more than optimistic about her economic prospects. I shall not, however, take your time and mine to recount her "glorious past"—which you would not believe—or to call attention to her "superior advantages"—which are, I am sure, already apparent to you! At the same time it is not out of place to share with you some of the enthusiasm accompanying the first wave of industrial and economic development which swept over these southern states. This may best be done by quoting from an address made upon the occasion of the laying of the cornerstone for the South Carolina Homespun Company in Charleston during the early years of the last century. The plant, incidentally, was financed in part out of

the proceeds of a state lottery authorized by the General Assembly of South Carolina. The speaker was a Mr. William Loughton Smith, at that time Grand Master of Masons in South Carolina. In the course of what appears to have been a very remarkable address, the Right Worshipful Master told some 3,000 listeners gathered for the event: "You have just witnessed the ceremony of laying the cornerstone of the first edifice intended for domestic manufacture on a great scale in this part of the Union: and you have witnessed the ceremony with emotions corresponding with the dignity and solemnity of the occasion. Permit me to congratulate you and my country at large on this first step toward the completion of an establishment from which we may entertain flattering anticipations of the most successful results." This however, was merely an introduction. Warming up to his subject the Right Worshipful continued:

"Here will be found a never failing asylum for the friendless orphans and the bereft widows, the distribution of labor and the improvements in machinery happily combining to call into profitable employment the tender services of those who have just sprung from the cradle as well as those who are tottering to the grave; thus training up little innocents to early and wholesome habits of honest industry and smoothing the wrinkled front of decrepitude with the smiles of competency and protection."[1]

Not everyone, however, shared the Worshipful Master's effervescent, though misguided, enthusiasm for this upsurge of economic activity. John C. Calhoun, for example, believed that cotton mills had no place in the economic development of the region and the *Southern Quarterly Review* as late as 1845 quotes a prominent citizen who had expressed it as his opinion that "manufacturing should be the last resort of industry in every country."[2]

There was a time when by force of circumstance it appeared that these ideas might prevail, and when the economy of the South "chugged" along on a single agricultural cylinder. This era was vividly described by Henry W. Grady, famous southern orator, in reporting a funeral he attended in his home state. The deceased, he said, "was a poor 'one gallus' fellow whose breeches struck him under the armpits and hit him at the other end about the knee . . . They buried him in the midst of a marble quarry; and yet the little

[1] A. Kohn, *The Cotton Mills of South Carolina*, Daggert Printing Company, Charleston, 1907, pp. 11–12.
[2] *Ibid.*, p. 13.

tombstone they put above him was from Vermont. They buried him in the heart of a pine forest, and yet the pine coffin was imported from Cincinnati. They buried him within touch of an iron mine, and yet the nails in his coffin and the iron in the shovel that dug his grave were imported from Pittsburgh. The South didn't furnish a thing on earth for that funeral but the corpse and the hole in the ground. They put him away and the clods rattled down on his coffin and they buried him in a New York coat and a Boston pair of shoes, and a pair of breeches from Chicago and a shirt from Cincinnati, leaving him nothing to take into the next world with him to remind him of the country in which he lived and for which he fought for four years, but the chill of his blood in his veins and the marrow of his bones." Fortunately for the South and for the nation that time has passed and only the musty pages of history remain to remind us that it ever existed.

There are certain well recognized difficulties involved in attempting to outline, even briefly, the economic prospects of a nation and particularly a region. In addition to the confusion contributed by the cold war and multiplied by recent events in Korea, there are further uncertainties with respect to national and international policies affecting such important areas of the economy as money, taxation, agriculture, labor, and trade. Even assuming a degree of stability in world affairs, there remains a question as to the probable effects upon a particular region of actions taken locally and in other regions, and the further effects of technological inventions and discoveries not now foreseeable. I have looked in vain for any reliable clue to the direction, or directions, in which these influences might be exerted and have concluded that it would, after all, be far simpler to discuss "Economic Prospects of the South" than "Political, Military, Scientific and Cultural Prospects of Governments Both Within and Without the United Nations." The simplicity of the assignment, however, is entirely relative.

The South itself is a complex of economic paradoxes as baffling as anything which can be found by inter-regional comparisons.[3] A brief reference to some statements lifted from the now famous *Report to the President on the Economic Conditions of the South*[4] serves admirably to illustrate this fact and at the same time pro-

[3] For purposes of this analysis "The South" is used rather loosely but generally to include the states embraced in the following geographic divisions: South Atlantic, East South Central, West South Central.

[4] Prepared by the National Emergency Council, Washington, D. C., 1938.

vides a "bench mark" by reference to which we may appraise our progress and anticipate our prospects. "The South," according to this Report, "has been richly endowed with physical resources. No other region offers such diversity of climate and soil. . . . The South leads the world in production of cotton and tobacco. . . . More than half the of country's second growth saw timber is in the South. The Region leads the world in naval stores production . . . and . . . has great potentialities for the production of paper.

"The South has more than 300 different minerals . . . contains a fifth of the Nation's soft coal. It mines a full tenth of our iron ore . . . possesses approximately 27 percent of the Nation's installed hydroelectric generating capacity. . . . Nearly two-thirds of the Nation's crude oil is produced in the South and over two thirds of our supply of natural gas comes from southern fields.

"The birth rate in the South exceeds that of any other region, and the excess of births over deaths makes the South the most fertile source for replenishing the population of the United States.

"In spite of this wealth of population and natural resources, the South is poor in the machinery for converting this wealth to the uses of its people. Its potentialities have been neglected and its opportunities unrealized."

This *was* the South as viewed by a Committee of Southerners just a decade ago. Whether the situation was really as bad as it was pictured and whether the South at that time was, as the President said, "the Nation's No. 1 economic problem" are not matters of great importance. What does count, however, is that some changes have been taking place and for the most part they have been for the good of the South and, I believe, for the good of the Nation. For present purposes we are interested in these changes primarily because of what they may indicate as to the future.

In my judgment the most important change which has taken place *in* and *about* the South is a change in attitude and in spirit. This statement needs clarification. I do not know that it is peculiarly a southern trait, but for too long we in the South have said things about ourselves which were neither complimentary nor true. When others outside the South have documented our description of ourselves with far-fetched illustrations like *Tobacco*

Road, we have offered in defense equally rare and unrealistic examples of retired gentlemen farmers leisurely sipping their mint juleps while being attended by a host of Negro servants. The most important discovery in a generation, not even excluding the techniques for splitting the atom, has been the discovery of the South by southerners and by those from other regions and countries. With this discovery has come a new and enlarged conception on the part of southerners of their opportunities and responsibilities as citizens and on the part of those outside the South of the role which the South can and should play in the total economy.

No phase of economic development in the South has been more pronounced or contributed more to the optimism concerning her economic prospects than that classified under the heading of "manufactures." Between 1939, the year after President Roosevelt characterized the South as "the Nation's No. 1 economic problem," and 1947, when the most recent *Census of Manufactures*[5] was made, the "value added by manufacture"[6] in the three geographic divisions which in general comprise the South, increased by 233 percent as compared to an increase of 204 percent in the nation as a whole. Twenty years ago (1929) the five great manufacturing states in the East North Central Division[7] added by manufacture a value which was 133 percent greater than that for the entire southern region; ten years later (1939) the difference was 100 percent; and in 1947 it was only 82 percent. At this rate, the South in another quarter century will have surpassed the combined manufacturing achievements of Ohio, Indiana, Illinois, Michigan, and Wisconsin, which in 1947 accounted for more than 30 percent of total value added by manufacture in the United States.

Since textiles occupy such an important place in the industrial picture of the South, some figures on employment trends in this industry may be of interest. In 1939, for example, 488,600 "production workers" were employed in the South for the manufacture of textile mill products, *exclusive* of apparel and related items. This was 46,000 *fewer* than the corresponding number reported in the

[5] U. S. Department of Commerce, *Census of Manufactures: 1947*.

[6] "Value added by manufacture" is calculated by subtracting the cost of materials, supplies and containers, fuel, purchased electrical energy and contract work from the total value of shipments. According to the Census, value added provides the most satisfactory measure of the relative economic importance of different industries.

[7] Ohio, Indiana, Illinois, Michigan, and Wisconsin.

Northeast.[8] By 1947, however, employment in southern textile mills had *increased* by 77,000, while that in the Northeast had *declined* by more than 9,000 with the result that the southern mills were providing approximately 40,000 *more* jobs than those in the Northeast. Within the same period the number of production workers in the "apparel and related products" group increased nearly 50 percent in the South as compared with 27 percent in the Northeast.[9]

Southern industrial expansion, however, is founded upon a base much broader than textiles. Actually the region is represented by a minimum of 50,000 production workers in *nearly every industry group* recognized by the *Census of Manufactures*. This development, moreover, is much more substantial than would be indicated by the more publicized in-migration of existing establishments. The South, with the aid of its own capital and with financial backing from other areas, is undergoing a new industrial revolution involving both the expansion of old industries and the introduction of new. According to a recent Report by the National Planning Association[10] this new development involves "the tire manufacturer, the electric light bulb maker, the automobile assembler, the farm equipment builder, and the cheese producer—all seeking additional consumers, needed materials, and adequate labor supplies. The chemical and newsprint industries likewise are in the picture . . . These new southern industries are turning out finished products, processing mineral resources, and consuming farm products other than cotton."

The Report further states that the South attracted "an increased share" of the overall expansion of industry during the postwar period because "its markets were growing faster, its supply of available raw materials was greater, and its labor supply more plentiful than in other parts of the country." A brief look at each of these "industrial assets" serves to give support to the conclusion of the Committee making the study that "The South's markets, materials and labor supply give it a sound basis for future advancement."

Reference has already been made to the high natural rate of

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[8] The Northeast here refers to the six New England and three Middle Atlantic States as grouped by the Census.

[9] Based on data from the *Census of Manufactures: 1947*.

[10] *New Industry Comes to the South*, a summary of the Report of the NPA Committee of the South on Location of Industry. National Planning Association, Washington, 1949.

increase in the South's population. But numbers of people do not alone insure a market. *They must have purchasing power.* The records show that income payments to individuals in the South increased approximately 183 percent between 1929 and 1947 as compared with 129 percent in the nation as a whole.[11] Retail sales, meanwhile, increased at a rate well above the national average in every southern state except Oklahoma, Mississippi, and Arkansas.[12] Current trends are even more pronounced as the South begins to reap the benefits of sales quotas based on buying power rather than on prewar distribution. The Federal Reserve Bank of Richmond, for example, observes that "Economic activity in the Fifth District during May was mainly in an up trend with trade levels stronger and production improving. Building activity continued at record levels and employment in general was rising. Manufacturing concerns are again thinking of new plants and expansion and several sizeable projects have been announced in recent weeks. . . . The cotton textile industry has sold the bulk of its output through the remainder of the year and several constructions are selling into the first quarter of 1951."[13] A check of 40 "Business Indexes" reported by the Bank indicates advances over the corresponding month one year earlier in 30 items and declines in only 10—all of them small. Meanwhile the *Manufacturers' Record*[14] for July comes forward with figures to show that "Southern construction during the first half of 1950 marks the year, so far, as the peak of the postwar period. Value of contracts awarded below the Mason and Dixon line is $1,782,682,000, a figure that not only is almost 25 percent ahead of the comparable period of last year but is also the largest since wartime days." All of this indicates not only the presence of a market but gives convincing evidence of a potentially much larger market in the future.

It goes without saying that all of this construction—much of it in the industrial field—is based not only upon knowledge of a growing southern market but on confidence in the future supply of southern raw materials and labor. In many cases industry is being attracted to the region simply because, for the first time in the long history of the South, materials and markets have been brought in close and delightful proximity. The great chemical

[11] *Statistical Abstracts of the United States*, 1949, p. 284.
[12] For further data on the southern market see *Georgia Business*, Vol. IX, No. 9, College of Business Administration, Univ. of Georgia, Athens, June 1950.
[13] Federal Reserve Bank of Richmond, *Monthly Review*, July 1950.
[14] *Manufacturers' Record*, Baltimore, Md., Vol. 119, No. 7, July 1950, p. 38.

industries provide an example. Cost of materials and supplies is also a factor. For example, a study by the Federal Reserve Bank of Boston reveals that "New England manufacturers as a whole paid an estimated average of 1.45 cents for every kilowatt-hour of electric power they consumed in 1947. That cost was 61 percent higher than the estimated average . . . paid by all United States manufacturers for their power requirements."[15] The difference in favor of the South is even greater than is indicated by these figures. In addition, the South not only already possesses, but is in position to produce on a sustained yield basis, many of the essential raw materials of industry which are not even available elsewhere. The rapidly expanding pulp and paper industry provides one example.

There has been much misunderstanding as to the status of labor in the South and particularly as to its inherent capacity to produce. Fortunately this misunderstanding has now largely disappeared except from the minds of a few who refuse to face the facts. Labor *without* capital is never so productive as labor *with* capital and for a long time labor in the South has been forced to make "brick without straw." Particularly has this been true in agriculture. As an illustration reference is made to a recent study[16] which shows that in 1940 "nearly one-half of all agricultural workers in the United States lived on southern farms and were trying to make a living on one third of the nation's agricultural land and with one fourth of the nation's livestock. For 'standing room' the average farm worker in the North Central States required 64 acres of cropland and 22 acres of pasture as compared with 24 acres of cropland and 11 acres of pasture for his brother under the southern sun. . . . To have provided each of the South's 4.3 million farm workers with an amount of cropland equal to that available to a farm worker in the Midwest would have required in 1940 a total of 275 million crop acres, or more than two and a half times that which was available. Or, to state it in another way, if the cropland which was available in the South in 1940 had been allotted to farm workers on the basis of 64 acres per worker (the average for the Midwest) there would have been 'room' in southern agriculture for only 1.6 million workers, or 2.7 million *fewer* than the number actually reported."

While there is no reason to believe that any such drastic read-

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[15] *Monthly Bulletin*, Federal Reserve Bank of Boston, June 1950.

[16] G. H. Aull, "Employment Prospects in Southern Agriculture," *Southern Economic Journal*, Vol. XIII, No. 4, April 1947.

justment as this will take place immediately, there is strong scientific evidence to support the conclusion that approximately 300,000 new workers will be available for non-farm jobs in the South every year during the next decade, at least. This, however, is only part of the story. These workers will be better educated and more skilled than similar groups of southern workers in any previous period. In combination with raw materials and a rapidly growing market, their availability for non-farm employment lends substance to the faith that the economic prospects of the South are better than good.

That this combination is effective may best be demonstrated by reference to an area directly adjacent to that in which we meet, namely, the Piedmont of the Carolinas. In this area may be found (1) the textile center of the world, (2) the greatest concentrations of wooden furniture manufacturing in the world, and (3) the world's largest producers of cigarettes. Not only this, but within any one of this area's major industries—and they are many—there is convincing evidence of world leadership. Take, as does the Federal Reserve Bank of Richmond, the textile industry for illustration.[17] According to the Bank "the world's largest women's seamless hosiery knitting plant; the largest weaver of mass-market rayon dress goods; the largest consumer of nylon textile yarn; the largest producer of ribbons; the largest output of towels and toweling; the largest weaver of home-furnishings fabrics; the largest producer of men's rayon summer suiting, . . . all these are located in the progressive Piedmont."

In spite of all this evidence of "bigness," which is a virtue we do not despise, the South has preferred to hitch its economic wagon to a lot of little stars beaming for the most part over areas which are characteristically rural and which are far removed from the blight of concentration so common to earlier developments.[18] All of this suggests not only a normal, healthy growth, but also an economic environment which can better withstand the winds of adversity when they blow. Doubtless these factors were taken into account by the noted commentator, Drew Pearson, who in "I Predict for 1950" made this observation: "I predict . . . the transformation of the land below the Mason-Dixon line into a beehive of industrial activity . . . Detroit will share some of its

[17] Federal Reserve Bank of Richmond, *Monthly Review*, June 1950.

[18] See "Rural Industrial Development in Four Southern States" by James M. Stepp, Clemson, S. C. Prepared for the National Planning Association, June 1948. (Mimeographed.)

near monopoly of the automobile industry with the South . . . Relocation of vital war plants . . . will boom the prosperity of the South . . . New plants, when needed, will be built in the South."[19]

Thus far, only brief mention has been made of agriculture in the overall economic picture. Here the prospects appear to be most favorable from the standpoint of *adjustments* rather than of *expansion*. The outlook is for fewer workers on farms, larger investments and more land per worker, more livestock, some increase in total production, and much higher per capita farm incomes. This, however, is contingent upon a continuation of present trends toward more and more workers in the manufacturing and construction industries, trade, domestic and personal services, clerical occupations, transportation, communication, mining and the professions. The indications are that these trends *will* continue and that they will provide the incentives for further diversification in the South's agriculture.

The shift to mechanization of the southern farm, long retarded by a super-abundance of hand labor without suitable alternatives, now appears to be in full swing and is gaining momentum every season. According to a report by the Bureau of Agricultural Economics[20] there were on southern farms in 1949 three times as many tractors as in 1940. With an increase in mechanization, the report says, the South will move toward more pasture and livestock. Actually, of course, the South is already moving in this direction and at a very rapid rate.

The new southern agriculture will require improved managerial skills and more efficient farm labor. Also, many small farms will need to be made larger and many people living on farms will find off-the-farm work. Census figures do not reveal the full extent to which these changes have already taken place, but a recent check in three South Carolina Piedmont counties indicates that about one fourth of the labor performed by farm families cooperating in the U.S.D.A. Agricultural Conservation Program was at non-farm jobs.[21] In another study it was found that only about half of the dwellings in typically rural areas of the Piedmont were occupied by *bona fide* farm families.[22] More of this sort of thing is un-

[19] *Cosmopolitan*, January 1950.
[20] *The Agricultural Situation*, Vol. 34, No. 5, May 1950.
[21] A. T. M. Lee and G. H. Aull, *Land Use and Soil Conservation in the Broad Rive Soil Conservation District of South Carolina*, S. C. Expt. Sta. Bulletin 373, June 1948.
[22] Unpublished data, Southeast Land Tenure Committee.

doubtedly in prospect. Already a significantly large number of industries have established plants in distinctly rural areas of the South and have had no difficulty in recruiting the desired labor from the surrounding countryside.[23] This is a combination which is hard to beat and it bodes well both for agriculture and for industry.

The economic life of the South is not, of course, entirely a matter of agriculture and of manufacturing. On the contrary, transportation and the trades and professions have played a significant part in the past; and all signs point to a relatively more important role for them in the future. For example, in 1940 approximately 2.6 million persons were engaged in transportation, communication and trade in the South. These occupations provided jobs for only about two out of every 10 workers in the South whereas in the rest of the nation the ratio was three out of 10. These figures indicate a need for not less than 1.5 million additional workers in these occupations if even one half of this discrepancy is to be wiped out. Likewise there is "need" in the South for one half million new workers in the professions, but even this number would leave us far below the national average in the percentages of employed workers engaged in these non-agricultural pursuits.[24]

Again, it is not anticipated that these changes are immediately in prospect but there is no scientific basis for the conclusion that they can long be delayed.

Recreation is an industry which must not be overlooked in any appraisal of economic prospects of the South. Without fanfare and for the most part without large scale public grants the South has developed into a veritable playground for a considerable proportion of the country's population. No other section can compare with it in the variety of its offerings available the year around.

It has been estimated[25] that by 1960 individuals in the United States will be spending something like eight billion dollars a year on recreation. The South will certainly come in for her share of this expenditure which, if only one fourth of the total, would compare favorably with the annual value of her cotton crop and would exceed the combined value of her tobacco and small grain crops.

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[23] See, for example, *The Labor Supply of a Rural Industry*, by J. M. Stepp and J. S. Plaxico, S. C. Expt. Sta. Bulletin 376, July 1948.

[24] The South, *America's Opportunity Number One*, Southern Regional Council, Atlanta, Ga., 1945.

[25] The Twentieth Century Fund, in *USA—Measure of A Nation*, Macmillan Company, New York, 1949.

In spite of this more-or-less rosy picture of economic prospects, there are many things which the South must do if these prospects are to be made real. We must further diversify our industry, we must continue drastically to readjust our agriculture, we must reorganize the structure of our government both state and local, we must meet our educational and welfare responsibilities to all our people.

These are problems of no mean proportions and they will call for all the ingenuity and skill of which we are capable. The fact that they are problems of long standing, however, should not weigh too heavily in calculations as to the future. Much of the progress which is evident in the South has been made in spite of these impediments. The masses of southern people have just begun to get a vision of what could be accomplished if these impediments were removed. This is one of the most encouraging signs on the entire southern horizon. As stated recently by a writer who styles himself "a damyankee from Connecticut,"[26] "Southerners are throwing off that deadening apathy which is a pernicious variety of in-growing conservation gone to seed. Their faith has been reaffirmed; their confidence rejuvenated. To a New Englander sensitive to this cast of thought, the great revolution in the South is that southerners are looking, not backward, but forward."

In closing I'd like to refer to a newspaper story reporting the recent "sale" of a locomotive horn by the Southern Railway. It seems that a Fulton County (Georgia) Legion Post wanted the loudest, noisiest horn it could get for use on a miniature train to be entered in a parade at the National Convention in Los Angeles. The Southern, it knew, was getting rid of its old Diesel horns which give off a sound like unto the mating call of a billy goat. The post commander wrote asking the Southern to let the Legion have one of these discarded noise makers and enclosed $100 in *Confederate currency* to "help defray expenses." Gravely, Southern's President, Ernest E. Norris, who incidentally has played no small part in the economic development of the South, accepted the faded bills as "perfectly legal tender."

"The South," he explained happily, "is rising again!"

[26] William Haynes, *Southern Horizons*, D. Van Nostrand, Inc., New York, 1946.

DYNAMICS OF FARM ADJUSTMENTS IN THE SOUTH

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THE accelerated rate of changes in the rural South keeps it in the foreground of interest as a major segment of our economy. My assignment is to array before you the generating forces, the causes, the dynamics of these changes. I shall not attempt to provide a full-scope picture of southern farming now. Nor will an effort be made to speculate in detail as to the farming pattern which may evolve as the South eventually approaches maturity in an equilibrium sense as between rural and urban adjustments and in relation to other agricultural areas.

Dynamics and Comparative Advantage

To deal with dynamic influences in farming leads one immediately through and beyond the whole complex of problems that make up the terms of comparative advantage. Yet, the classical version of comparative advantage and least comparative disadvantage is a static concept, with the state of the arts remaining constant. Stated most simply it is, "A product tends to be produced in those areas where its ratio of advantage over other areas is higher, or of disadvantage is lower, than for any other product."[1] The analyst studying the reasons why changes are taking place and the nature of the associated adjustments looks then to the forces which modify the framework of comparative advantage. For example, what are the probable effects of full mechanization in rice production and the opportunities which it affords for improving the economic lot of rice growers within given areas and between areas? This requires that the approach be made in terms of farm operating units and the adjustments thereon, the production area and the aggregate of the changes therein, the prospective pattern of advantage between source areas of a given commodity and closely associated commodities, the current and prospective, local and nation-wide markets for the products, and alternative uses for the factors of production.

[1] John D. Black, M. Clawson, C. R. Sayre, and W. W. Wilcox, *Farm Management*, Macmillan Company (New York, 1947), p. 376.

Operating Units and Technological Changes

Increases in net incomes from technological advancements are the most widely recognized sources of dynamic stresses in our economy. We are essentially production minded in this country and view efficiency as the touchstone of progress. Gains in technology differ widely in their effects upon production organization, output, costs, and returns. Classified in terms of production organization and output they are:

I. Complex technological changes
   A. Output increase
   B. Output same
   C. Output decrease
II. Simple technological changes
   A. Output increase
   B. Output same
   C. Output decrease

The major groupings—complex or simple—depend upon whether the new technology can be used economically, in the highest profit sense, without changing the majority of the sizes and types of farms in a production area. Primary drainage, mechanization, and irrigation fall into the category of complex technological changes. They are the advancements which have come in at varying rates during the past century to provide new foundations for farming in the South and Southwest. For example, it was not until after the flood of the Mississippi River in 1854 that public demand for a uniform levee system brought action in Arkansas, Louisiana and Mississippi.[2] Prior to that time the alluvial areas of the Mid-South had been farmed on a hit and run basis.

There can be little or no argument that primary drainage and irrigation are complex changes which provide output increases for the production unit and for a source area. Mechanization, unless accompanied by substantial improvements in production practices, will in many situations fall into the category, "output same" or "output decrease." When the quality side is considered, the decrease in output may be an important factor determining widespread introduction of a new machine. This has been true for

[2] Robert W. Harrison, "Levee Building in Mississippi Before the Civil War," *Journal of Mississippi History*, April, 1950, Vol. VII, No. 2.

cotton harvesters. It is true likewise for such tools as peanut and potato diggers and various attempts to mechanize tobacco, fruit, and vegetable harvesting.

Simple technological advancements can be made within the framework of prevailing sizes and types of farms. Such advancements which increase output increase the returns to each factor of production so long as there is a good demand for the added volume of the commodity. Certainly hybrid corn, disease-resistant varieties of cotton, and crossbred hogs are telling examples of such changes.

If production increases faster than the demand for the product, prices will go down unless artificially supported. When that happens a part or all of the gain from the improvement is shifted away from farmers to consumers.[3] Only those producers who make the change first profit directly.

Of vast importance, too, are the simple types of advancements which lower costs with output remaining at about the same level. The direct substitution of anhydrous ammonia for ammonium nitrate and nitrate of soda lowers costs approximately three cents per pound of nitrogen applied on the alluvial soils of the Mid-South, while yield responses remain the same.

It must be recognized that simple technological advancements do not offer nearly the same dynamic possibilities for economic betterment where a product is being continued in production at least comparative disadvantage. In the study, "Agricultural Adjustments Toward an Efficient Agriculture in the South," it is recognized that most of the cotton growing areas in the Piedmont would stay in production even with fully competitive prices.[4] There are few labor-intensive, high-value enterprises to take the place of cotton, particularly on small farms. Basic factor combinations in the Piedmont are such that with mid-war prices prevailing in 1943 the gross farm income per capita was $307. Under those conditions a simple technological improvement could not readily become a part of what Dr. Sherman E. Johnson terms the "chain type of reaction," such as efficiency gains in the Corn Belt with the

[3] Sherman E. Johnson, "Technological Changes and Rural Life," *this Journal*, May, 1950, Vol. XXXII, No. 2.

[4] "Agricultural Adjustments Toward an Efficient Agriculture in the South," reprint from *Study of Agricultural and Economic Problems of Cotton Belt*, House of Representatives, Congress of United States, July, 1947.

combination of mechanical power, hybrid corn, commercial fertilizer, and added legumes in rotation.[5]

Research Sources of Dynamics

As the American geographic frontiers were enveloped we looked first to production for export, then to industrialization and improved transportation to avoid the woes of economic stagnation. More and more the attention of the scientist, the farmer, industrial enterpriser, and the general public are centered upon scientific research as the primary generator of changes in the economic life and perhaps the system of values which has evolved in different segments of our society.

Individual initiative, the discipline of rather narrowly defined scientific fields, and the perspective and drive of a few outstanding administrators have been the foundations for public research in agriculture.

The research has always been well-intended even though not fully adequate to provide irresistible stimuli for farm adjustments in areas such as the Appalachian Highlands, Piedmont, Western Sandy Coastal Plain in Texas, Louisiana and Arkansas, and the Clay Hills in Mississippi and Tennessee. In those and in many other areas of the United States the economic and social history does not provide the environment for full utilization of accumulated farm research results in the modal production situations. The farms may be too small. As Dr. T. W. Schultz stressed in a paper presented at the 1949 annual meeting of this association, there may be cultural impediments to participation in economic progress. In the sense of modern techniques and levels of living, these areas are in an embryonic development state. These dynamic influences must come from non-farm sources to precipitate economic progress, when the latter is measured in terms of increased levels of living as well as security. Current income locally can supply very little of the capital needed to finance industrialization and mechanization. Skills and managerial ability are not attracted from outside sources and the cumulative effects of low income upon education and health improvement have largely thwarted the efforts of many outstanding leaders to energize fundamental changes in the combinations of productive agents in such embryonic development areas.

[5] Johnson, *op. cit.*, page 232.

In sharp contrast to the embryonic development areas are the Delta of the Mid-South, the Gulf Coast Prairie in Texas, High Plains in Texas and Oklahoma, Limestone areas of Alabama, Georgia, and Tennessee, Arkansas Valley in Arkansas and Oklahoma, and much of the Coastal Plains from North Carolina through Georgia. These areas are in a transitional stage of development. The upsweep of the all-purpose tractor, mechanical harvesters, improved varieties, higher-rate fertilization, has provided the start from agricultural research which has gained a momentum now that makes the process of change in these areas entirely irreversible. These areas, as they mature into the modern comparative advantage pattern with the new technologies in use, will have a new set of resource combinations, new levels of real income, a revamped value structure for fixed investments, and a new balance between rural and urban populations and between farm and industrial employment.

Dr. Earl O. Heady, in an excellent article concerning economic and welfare aspects of technology as a dynamic force, recognizes the schisms which may develop from technological advancements which increase welfare of one group of persons while increasing welfare of others to a lesser extent or decreasing welfare for other groups.[6] He develops a very useful classification of technological advancements in relation to total cost and the elasticity of demand. Heady comments upon the limitations of his own analysis as a "closed economy approach." He leaves out many of the stepping stones necessary in the planning of agricultural research which would provide for orderly adjustments in each source area, when looking to research as the primary stimulator of desirable long range adjustments.

The long-term cotton picture can be used best to outline the potentialities for accelerated gains from research as a dynamic influence for sound farm adjustments. There are three main facets to the problem encountered in cotton growing areas—low incomes, new competition in domestic markets, and instability of foreign outlets.

The efforts of the geneticist and plant breeder are aimed first at increasing grower incomes. Breeding improvements are almost inevitably simple advancements with increased output, fiber

[6] Earl O. Heady, "Basic Economic and Welfare Aspects of Farm Technological Advance," this *Journal*, May, 1949, Volume XXXI, No. 2.

qualities remaining the same or being increased. The demand for cotton has generally proven to be inelastic. Increased supplies on the market have meant large reductions in prices whenever price supports would permit. Taken alone these facts could easily lead to wrong conclusions concerning the basic role which the plant scientist must play in meeting the American cotton situation. It could be reasoned that a higher yielding variety would simply lower prices for the grower when adopted by a large proportion of the producers. Those conditions will follow simple technological advancements which increase output of an undifferentiated raw material for which the elasticity of demand is less than one. This would be true for the plant side of cotton research if emphasis were upon yield increases alone. But the emphasis in genetics research should be to determine the inheritance pattern which will impart new and extended properties to cotton fibers, thereby modifying its demand in competition with other raw materials in textile markets. That has become the approach of the most of the geneticists and breeders working on cotton improvements in the USDA, State Experiment Stations, and in private companies.

Known properties of cotton which contribute to high-quality yarns and high-quality fabrics would have to be extended by 50 to 100 percent to make cotton a superior raw material for many end use markets. Unrecognized properties which are now grouped, by classers, into the vague attribute of "character," must be isolated and measured accurately and rapidly if geneticists, breeders, and processing-research scientists are to take them into account in the future. Upland cottons now produced in the United States do not differ greatly, except in Western Oklahoma and Texas, in such fiber properties as strength, length, fineness, and uniformity.

New sources of properties have been found outside the range for uplands, particularly through species hybridization. These interspecies crosses provide one of the best "ladders" up to an adequately high plane for cotton improvement. The fact that interspecies crosses in the "test tube" stage are demonstrating 75 percent greater strength, smaller perimeters, thicker cell walls, and more luster than our present commercial varieties could mean that cotton farmers would be offering essentially a new raw material in competition with rayon, nylon, and orlon. That type of simple technological advancement which could modify the demand structure for cotton would mean added incomes to farmers, even

if the basic combinations of productive agents were to remain as they are now. They would add to cotton growers' incomes in areas in embryonic as well as transitional stages of development. Their effects would be much greater in the transitional areas where they would become a part of the chain reaction with mechanization and irrigation.

It must be stressed that the development of these new cottons would still be meaningless insofar as added incomes to growers is concerned, unless the differences of such a raw material are recognized and their identities maintained from the farm level to the mill. Differentiation by variety, area of production, and year of growth, with early-season laboratory tests should provide the basis for differential pricing necessary for gains in grower incomes in the long run from simple technological advancements. Here is one of the places where the plant scientist needs more adequate help from better informed marketing research workers.

The fact that technological advancements provide potentialities for higher returns for each productive agent—land, labor, capital, and management—has made mechanization and irrigation irresistible in the areas now in the transitional stage. Economists lag much too far behind in their appraisals of farming systems prompted by modern techniques. Too much is being left to trial and error by farmers, and farmers are being left too much at the mercy of over-zealous promoters of uneconomic changes.

Sources of Transitional Maladjustments

Perhaps the most important push of all is the knack of the salesman in overcoming farmer inertia. As the shortages of World War II gave way to adequate supplies, salesmen were reborn. In the field of production equipment they have used sales artistry much more than a systematic approach to cost reductions and the overall farm operation. There has been much more emphasis upon "trade-in price" than lowering of operating costs for a used tractor or pickup truck. This is in spite of the fact that fuel, lubricants, and repairs amount roughly to three times more than depreciation for farm tractors.

The high ratio of people to land resources presents a vicious circle of low capacity of one production factor for another and low incomes on a very high proportion of southern farms. The pressures remain so great, even with out-migrations of 25 percent and more

in some counties during the past 10 years, that it is most unlikely that the modal group of farms in many areas can shift to the highest-profit combination with a change such as mechanization. Minimum efficient-sized units are more nearly the transitional organization which will remain in the picture for perhaps a generation or so. The minimum efficient-sized unit represents a production combination which provides a return to the enterprises using new techniques that is greater than the returns from highest-profit organized farms utilizing established techniques. The minimum-efficient unit held at that size because of factor supply problems, such as shortage of good land, will usually operate at volumes beyond the least-cost combination. The abundant supplies of one or more other factors with vertical diversification make that possible whenever there is alert management.

Where super-salesmanship or misplaced guidance has been the source of the change, adjustments are often made at volumes much less than the least-cost combination; and the resultant combinations are far below the potentiality for the operator, the community, and for the consumer. Such maladjustments are important reasons why tractor numbers increased 170 percent between 1938 and 1948 while harvested acreages decreased by 12 percent in 10 Southern cotton states. Numbers of horses and mules decreased only 30 percent during the same period.

Dynamics Beyond the Farm

Consequences of dynamic influences in farm adjustments are almost inevitably greater than the sum of the changes which can be anticipated when the potentialities of a new development are viewed separately for each of the major size and type groups of farms in an area. Of top importance in such considerations are the inter-farm economies which advancements make possible. There can be little doubt that the accumulated possibilities for inter-farm economies in the use of labor, machinery, and transportation facilities were main reasons why 20 percent fewer farm workers in southern farms produced 17 percent greater volumes in 1944 than during the period 1935–39.[7] In the main these inter-farm possibilities have not been tapped in a substantial way except

[7] Population data from *Agricultural Adjustments Toward an Efficient Agriculture in the South*, reprint from hearing on *Study of Agricultural and Economic Problems of Cotton Belt*, House of Representatives, Congress of United States, July 1947; Farm production comparisons from *Peacetime Adjustments in Farming*, USDA, Misc. Pub. No. 595, p. 6.

when shortages occur. There is some joint ownership of equipment and considerable custom work is done. Such developments have been slow where small acreages are involved. In a farm mechanization study in the Piedmont area in North Carolina, Greene and his associates pointed out that as early as 1944 farms operated with tractors in the area had only 72 acres of cropland per tractor.[8] Only 16 percent of the farms operated with horses had more than 50 acres of cropland. Further additions would have to be on units which would bring cropland per tractor down rapidly; and they were only being used for 440 hours per year on the average. The usual equipment on these farms consists of a breaking plow and a tandem disk. About one farmer out of two had a bush and bog disk, and one out of three had a combine. Only a few farmers had enough work to justify the purchase of tractor equipment for such operations as planting, cultivating, or mowing. Although 75 percent of the tractors were used for some custom work, the jobs done were predominantly breaking land and harvesting. Planting and cultivation operations were seldom worked out on a custom basis.

Cumulative effects of grain and livestock changes have developed sufficient volume or shown enough promise for the future that capital for local market facilities has been attracted. As a result, lowered marketing costs have helped greatly to shift some commodities in some areas from production on a least comparative disadvantage basis to full competitive entry into commercial trade channels. For example, the first three grain elevators went into operation in the Delta in Mississippi in 1939. They came in because of the greatly expanded oats acreage which had occurred with cotton acreage restrictions during the thirties. Oats were grown as a least comparative disadvantage crop. Now with new soybean varieties, new hybrid corns grown with large inputs of nitrogen, the picture has changed rapidly. There are now 11 grain elevators in the area which expect to do economical volumes of business in 1950. Even with that increase there will be a serious soybean storage problem in the Mid-South this fall. Cotton acreage allotments have again been a factor in the increase, but soybeans yielding 30 bushels per acre and labor inputs of five hours are fully competitive with production in the "bean kingdom" of the Middle West.

Of vast importance as a dynamic influence for livestock produc-

[8] R. E. L. Greene, H. Brooks James, and C. G. Dawson, *Farm Mechanization in the Piedmont*, N. C. Agr. Exp. Sta. Tech. Bul. 84, August, 1947.

tion is the entry of nation-wide distributors of dairy and poultry products into southern production areas. Seasonal peaks of production have been smoothed out some by the development of adequate pastures and the use of improved feeding practices, but diversion of surplus supplies in and out of the South can eventually do much to stabilize local markets for these products in the South and elsewhere. A complementary seasonal relationship between dairy and poultry production for Northern and Southern areas is much more likely to materialize significantly in the future than the competitive fears which have influenced many analysts to rather distorted conclusions in the past.

Factor Supplies and Alternate Uses

Approximately 49 percent of the farm people in these United States live in the 13 Southern States. They tolerate incomes averaging $573 per farm person in a high price level period such as 1944–48 compared to $1,073 for the nation. Outlining the makeup of an efficient agriculture in the 16 main cotton growing sub-regions in those states, a rough determination was made that 31 percent of the people dependent upon farming in 1943 would not be required to man an efficient agriculture in those areas. In some production areas 50 percent fewer people could man an efficient agriculture.[9] Capital requirements would increase three to four fold in areas such as the Delta in Mississippi. There are too many people, not enough money invested, not enough fully developed land, and rather rough management practices.

Haphazard management practices have accumulated over generations of following farming methods not based upon close precision in operations. This lack of precision efforts has permeated the whole structure of southern farming. It is the "rheumatism" which has made for creaky joints whenever efforts are made to set the stage for the introduction of capital and vertical diversification into farming systems. For example, pasture building and increases in beef cattle have not resulted in progress that is really startling. In 10 southern cotton states, North Carolina through Texas, meat production increased approximately 18 percent and milk production decreased about four percent from 1938 to 1948. This

[9] *Agricultural Adjustments Toward an Efficient Agriculture in the South*, Reprint from hearings on *Study of Agricultural and Economic Problems of Cotton Belt*, House of Representatives, Congress of United States, pp. 22 and 45.

is compared with an increase of about 29 percent in meat production and nine percent in milk production in the other 38 states during the same period. Production coefficients, as rules of thumb, are much more widely known for cotton, tobacco, and rice than for cattle, chickens, hogs, and lumber. That has been an important reason for keeping so much of the financing tied to the cash crops. Knowing that a family can hoe and pick about 10 acres of cotton, and knowing about how much fertilizer and seed is required has given a feeling of precision which handlers of capital like to have. They think they know what they can depend upon from cash crops with which they have grown up.

Returns upon new capital inputs would be at a low rate in the embryonic development areas. Declining interest rates in this country have been a function of both supply and minimization of risk through governmental and local guarantee approaches. Where venture capital has pushed into areas to participate in adjustments amounting to complexities of changing farming systems, they have anticipated high profits as direct returns from farm income, income from processing, and large increases in the structure of capital values. Those are the conditions which prompted investments of $125 to $200 per acre for irrigation installations in such areas as the Pecos Valley in Texas and the San Joaquin Valley in California.

The combined effect of fertile land and complex technological advancements are self-energizing influences for adjustments. Such dynamics are possible in areas which have the physical attributes essential for high comparative advantage as they mature, in the sense that production combinations reflect efficient utilization of the superior techniques of the times, and the real incomes are roughly equivalent to the income levels in other lines of endeavor.

In the embryonic development areas there tend to be shortages of all factors other than labor. Agricultural research has contributed to better living in those areas, and will so continue, but the advancements now in sight are not of a magnitude to force basic adjustments from within agriculture.

Availability of under-utilized land and some labor shortages in combination with new technologies have been the pull for mechanization in areas such as the Delta in Mississippi. There until recently about 40 percent of the land resources have been the base for 90 percent of the net farm incomes. The better soils, the sandy

loams, have been used intensively—although with limited efficiency. The availability of second and third quality land and the potentialities of supplementary and complementary enterprises with a mechanized cotton enterprise have made for the "auto-dynamic" changes now in process.

Rough estimates of break-even points in the Delta for supplementary crops with 1948 costs are: oats, yielding 50 bushels at 80 cents per bushel with one ton of lespedeza hay following; soybeans, 20 bushels per acre at $2.00; corn, yielding 40 bushels at $1.25.[10] Beyond these levels these supplementary enterprises will help carry the overhead on mechanized Delta farms. It is difficult to anticipate the relative position of such an area in the modern pattern of comparative advantage as it matures. There are several million acres of under-utilized land in the South. The self-generating effects of technology in such areas will depend greatly upon the inherent fertility of the land and the availability of capital at low interest rates and improvements in the quality of management. For example, in a study of farm adjustments in a Piedmont county in Georgia, it was found that enough good land was available for operating units of 60 acres of cropland for all farm families, without any reduction in size for those farms having more than 60 acres of cropland. All cropland would be on Class III (land use capability classification) or better land.[11]

Getting More Out of Dynamic Influences

The achievement of more rapid economic progress will require substantial modifications in our current approaches to farm adjustments. We are persistently gearing our agricultural research, our educational undertakings, and our farm action programs as though we had a homogeneous production pattern. Taking farm policy first, the Agricultural Acts of 1948 and 1949 are negative approaches to farm adjustments. Their central themes are price stabilization through withholding surpluses with a minimum of attention to factor allocations, to income disparities between

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[10] Estimates based upon a paper presented by James Hand, Jr., at Fourth Annual Beltwide Cotton Mechanization Conference, Greenville, Miss., July 1950; comparisons with plantation records; and the results of mechanization studies being conducted by Dr. G. B. Crowe for the Bureau of Agricultural Economics, USDA, and the Miss. Agr. Exp. Sta., Stoneville, Miss.

[11] M. C. Conner, *et al.*, *Farm Adjustment Opportunities in Greene County, Georgia*, Ga. Exp. Sta. Bul. 221, 1942, p. 69.

major areas, and to the state of development of different agricultural areas in relation to new technologies. Such approaches to policy function fairly satisfactorily in an area such as the Corn Belt with its relatively mature economy in an adjustment sense. The Agricultural Act of 1949, in spite of its crudities in some respects, will provide satisfactorily for the long term balancing of supplies, with the exception of perishable commodities. It must be supplemented with approaches to farm adjustments which will take advantage of the dynamic influences growing out of agricultural research and industrialization in such areas as the South.

There is need for revival of the suggested use of a single farm plan as the basis for all cooperative undertakings between the individual farmer and state and federal agencies. Without such orientation the broad generalizations of many of our programs are stimulating uneconomic uses of new technologies, which otherwise could be harnessed with substantially lower costs and greater contributions to welfare of both producers and consumers.

The use of field-size proving ground studies and pilot experimental farms of different sizes and types over a widening range of physical resources and market outlet situations will do much to screen research results in terms of economic significance, as well as in terms of analysis of variance used by the biological sciences. The new generation of biological scientists is anxious for more closely aligned cooperation from economists in the applied phases of their investigations. Economists have continued to deal too much in arithmetic with too little understanding of underlying production relationships; and the result is that common grounds for joint appraisals have not been developed in many instances with research workers in other fields.

It is almost unthinkable that we have made the slow rate of progress in utilizing new technologies in the areas of the South where conditions are favorable to the introduction of complex technologies such as mechanization, and, to a lesser extent, irrigation and drainage. It is possible to plot the alternate courses of prospective costs and returns which could be anticipated reasonably for most production situations by carefully prepared farm budget analyses. Farmers are provided guidance in generalities rather than in terms of the production situation with which they are faced.

A leaf should be taken out of the book of the people who have

been conducting health programs in the South during recent years. Through expanded public health services, increased hospital and medical facilities, improved environmental sanitation, and extended health education, there have been remarkable reductions in the toll of preventable diseases and premature deaths in the South. According to figures from the Statistical Bulletin of the Metropolitan Life Insurance Company, the death rate from tuberculosis dropped more than 40 percent, from pneumonia and influenza, about 55 percent, and from principal communicable diseases of childhood, 80 percent, from 1935 through 1949.[12] In the past 15 years the number of pellagra cases reported annually has decreased from thousands to only a few hundred. Malaria cases reported for the same 10-year period dropped from about 137,000 to less than 5,000. This striking development of controls over the "captains of death" has been attained through well-coordinated health programs centered upon widespread use of clinical methods and preventive medicines. Certainly the specific economic gains from such programs were more remote than those which are before us in the general field of agricultural adjustments. We fall far short in the field of economic diagnosis, the development of production guides oriented to local production situations, and the training of both labor and management to cope successfully with new tools and techniques. Workers in the medical profession and in public health seem to be better able to take the findings of the specialties that have developed in their fields and do a much superior job of diagnosis and adaptations of therapy methods than economists have been able to do.

It is apparent that the rate of introduction of improvements in southern farming is being raised faster than net population increases. This, plus the fact that added capital has come into the South, means inevitably that levels of living will rise substantially. There are many evidences that the roles of economists in this process of improvement have become mainly those of economic historians, statisticians, and critics. Would it not be desirable that agricultural economists serve more effectively as developers of methodology and guides for the acceleration of sound farm adjustments to the dynamic influences which surround us?

[12] *Statistical Bulletin*, Metropolitan Life Insurance Company, June, 1950, Volume 31, No. 6, p. 5.

DISCUSSION

RUSSELL W. BIERMAN
Federal Reserve Bank of Richmond

Dr. Aull has presented a comprehensive and stimulating paper on "Economic Prospects of the South." I am in such complete agreement with it that I find it somewhat difficult to discuss the paper adequately. However, there are some points upon which a little additional comment may be offered.

The glowing picture of southern industrial progress presented is indeed heartening to southern agricultural workers, although it may alarm those who are concerned with New England's decline in the American economy. In the rapidly growing industrialization of the region, southern agriculture finds new opportunities and new problems.

Professor Fulmer of the University of Virginia in his recent book, *Agricultural Progress in the Cotton Belt Since 1920*, has documented the relation between industrial progress and farm diversification. Urbanization, Professor Fulmer says, has increased the demand for perishable farm products such as milk, eggs, and vegetables. He finds, in fact, that as urban population increases, the demand for these products expands in a geometric ratio because of the higher average level of income associated with increased urbanization. The expanded demand for these perishable products and for livestock provides opportunities for farmers to supplement the great staple crops of the South with other profitable enterprises.

Industrial development and progress in the South are also important in providing alternative employment opportunities for the greatest farm crop the South has—children. In spite of the growth of nonfarm employment in recent years, which Dr. Aull has so vividly described, there are still a large number of poor farmers in the South today with little land, livestock, or equipment, but with plenty of children. For them—and for their children—industrial progress offers new opportunities for useful and remunerative employment.

The prospective and actual migration from farms to cities, and from farming to other occupations, raises the problem of providing the requisite vocational training for farm boys and girls in order that they may become useful and, we hope, well paid members of the nonagricultural labor force. It also raises the question of the social and economic cost of this migration.

Dr. Francis E. McVay of North Carolina State College in his invaluable bulletin, *Factory Meets Farm in North Carolina*, has made a significant contribution toward our understanding of the effect of off-farm employment on farmers. He found, for example, that off-farm employment tended to decrease the relative importance of labor-intensive cash crops such as cotton and tobacco. His study also showed that, because of the decreased emphasis on cash crops, the total income of the farm family increased by only half the amount of income received from nonfarm sources.

A third problem arising from industrial progress lies in developing the

managerial skills needed for an efficient southern agriculture. Our friends in the Extension Service and in vocational agriculture may regard this as more of an opportunity than a problem.

Dr. Aull has mentioned the trend toward larger farms, more livestock, more mechanization, and larger investments and more land per worker. All of this raises the problem of providing or moving more capital into southern agriculture. It is encouraging here to note the progress being made in this connection by commercial banks and other lenders (particularly the Farmers Home Administration). Banks are finding, in fact, that extremely long-term credit is not always needed to finance substantial farming adjustments; in many cases a series of well-planned short-term advances will do the job as well or better. I am afraid that too often in the past we have had in the South a combination of poor farming and poor banking. But southern banking has also had "a change in attitude and spirit." Today we find in the majority of the Southern States that the State Bankers Associations, in cooperation with their respective state Extension Services and Federal Reserve Banks, are engaged in educational programs to encourage the use of bank credit for financing farm adjustments.

DISCUSSION

ROY E. PROCTOR
University of Georgia

In discussing "Dynamics of Farm Adjustments in the South" it is logical to visualize the human impulse for using nature more fully in order to satisfy additional wants. It is this stimulus that creates the need for adjustments.

People who have a comparative advantage with power machinery versus mule power should seek power equipment. But if in order to use power equipment efficiently John Q. Farmer must give up his small, independent holding and move to a job as hired man for Mr. Big Plantation, he may create a comparative disadvantage for himself. As soon as Mr. Plantation has all the hired men his other resources can use effectively, some of the Farmer cousins will move to industry. Such moves have been numerous in recent years; we hope to improve personal comparative advantage.

Dr. Sayre has done an excellent job in showing how the adjustments in the South are dynamic. In a democratic society, the consumer, by his choices and effective demand, calls the signals for what and how much. Therefore, one's comparative advantage may change either because of or in spite of lowered costs or improved output through any technological process. The mobility of families appears to be somewhat less than the mobility of capital. Therefore, regional or geographic comparative advantage may be of less concern in this technological age.

I'm no more worried about the plight of small scale farmers in our march toward efficiency of the large firm than I am about the small blacksmith operator in Pittsburgh or Detroit. Each of them needs help to find where his least comparative disadvantage lies.

Let us not concern ourselves with the dynamics of adjustments associated with cotton, machinery, milk or soil conservation as such, but only as they affect people. It is total income to all people which must rise to give the types of education and other advantages we want. The writer is very grateful for Dr. George J. Stigler's notes in this *Journal*, August 1946, in which he exposed a fallacy of the idea that total labor income rises as farm businesses increase in size. On the contrary, he pointed out, the average net income per farm worker, including the operator, decreases as the size of business increases.

Most small units may hire "custom operated" power equipment, and certainly they may, and do, buy improved seeds, more fertilizer and more legumes for the rotation. Additional legumes usually mean another cash seed crop or feed for more livestock; thus a type of chain reaction is generated to give fuller use of land and labor as well as higher yields.

For the small operator, some planning is required so that his labor force, teams, and equipment are not unproductive while he is hiring power equipment. Frequently, the error is forced idleness for the present productive factors replaced by hired equipment for a given operation. Teaching the selection of enterprises for a farm balance may be the big dynamic job. A portion of the small farm operators may take on the additional task of serving as the custom operators of power equipment, working at home only such time as they are urgently needed. Other enlightened operators are adding poultry, dairy cattle, and high priced seed crops to replace enforced reduction in cotton acreages. The very dynamics of the situation open many avenues for teaching opportunities of advancing the adjustment in all segments of our agricultural sphere.

The total farm population of Georgia dropped 40 percent (1.63 million to one million) from 1920 to 1945. Some of us think it has decreased too much. At least, there must be too much land per person, judging from the large amount of it that is not being used intensively. The hired and family farm workers declined 32 percent in Georgia from 1940 to 1945 while such decline was only 16 percent for the United States and 25 percent for the 13 Southern States. This appears to be a very dynamic farm adjustment. I still think it has gone too far but land values are out of line. For example, if 50 bu. corn land sells for $200 per acre, the 25 bu. land should sell for about $40 or $45, so that the interest saved ($8 to $10 per year) will buy sufficient soil amendments to give comparable yields in a rotation.

The writer frankly does not believe that eliminating the small units of production, so as to make way for greater technological efficiencies, will improve the welfare of all the people. So long as individual choices are free and capacities vary, some men will be employers and others employees; some will be large operators and some small operators; but all will enjoy the advancement made by each.

These additional ideas and different approaches are not to minimize the statements of farm adjustments in the South. However, we hope that this will amplify the current responsibilities of agricultural leaders for making our adjustments count the most toward the welfare of our farm people.

COTTON PRICE POLICY IN RELATION TO THE DOMESTIC MARKET

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National Cotton Council of America

MY PURPOSE here is to explore the effect of price upon the quantity of cotton that will be absorbed by the domestic market. Thus my subject, being limited to the demand schedule for cotton, is more narrow than the title would imply. It is an intricate subject, both in its data and in its theoretical concepts. Those of us who emphasize it are sometimes condemned as advocates of "charging what the traffic will bear." The connotations of that odious phrase are drawn from the worst traditions of monopoly; but I have never found that the cotton farmer is quite on a par, in income or bargaining position, with the robber baron of the nineteenth century—or indeed with the average American citizen of today. Moreover, there seems to be general agreement that the suppliers of cotton should be deeply concerned about "pricing themselves out of the market." If we regard this problem seriously, as indeed we should, we must acknowledge and explore its complexities. We must seek to understand in what way and in what degree it is possible for the price to rise above "what the traffic will bear." I prefer to designate this subject as the "price requirements of the market."

At the outset let me pay respects to some of the other considerations that deserve recognition in a price policy for cotton. I do not mean to imply that when we have discovered the price requirements of the market, we have arrived ipso facto at the one sound price for cotton. One of my gravest reservations is whether it is politically possible for any governmental program to achieve such a price and not go above it. Notice must also be taken of (a) the interest of the consumer, (b) the stability of agricultural income and of the general economy, and (c) the optimum use of human and physical resources. As for the consumer's interest, I feel that for this particular commodity the requirements of the market are severe enough to give him thoroughly adequate protection. As for the general economic stability, the requirements of the market, in the sense here used, contain no excuse for exceptionally wide price fluctuations. Certainly a moderately stable price is desirable

from many standpoints. The subject of resource utilization demands a slightly longer comment, though it is outside the scope of this paper.

I have encountered in some quarters a feeling that sharp price reductions are a prime requirement for good resource use in cotton production, and that those of us who emphasize market requirements are blind to the implications of resource utilization. It is suggested that a low price is a bitter but wonderful pill which, if the South takes it, will somehow bring the patient great improvements in industrialization, mechanized farming, and balanced farm enterprises. Let me say with emphasis and some feeling that I am in favor of these improvements. They are fundamental to the economic progress of the Cotton Belt. The question, however, is what does price have to do with these trends in southern agriculture which make for better use of resources.

On this question, many students of southern agriculture are far better informed than I. Merely let me say in passing that, while the Cotton Belt is a patch-work of many different farm situations, the primary reasons why high-cost cotton producers remain in cotton are not the high price but (a) the lack of available alternatives either on or off the farm and (b) the sluggishness of a population, inured to the handicaps of low income, in making available adjustments.

I shall proceed now to examine the requirements of the domestic market. May I do so in terms of my own observations, with the clear understanding that nothing said here should be interpreted as a reflection of the policy of the organization with which I am associated.

The price of cotton has a tendency to influence, first, the aggregate purchases of cotton together with all competing materials, and second, the power of cotton to compete for a part of this aggregate market. These two influences are integral parts of the problem.

Of the two influences, the first is by far the less important. The demand for textile products at the retail level may have considerable elasticity in response to price change, but the cost of the raw cotton in the typical retail product is not large. For the great bulk of cotton's end products, the raw fiber cost is from 10 to 20 percent of the retail price. Thus a change in the price of cotton tends to produce a relatively small price change at the retail level,

and the effect on the aggregate consumption of fibers tends to be small.

This position runs counter to a theory which has long been held in some respect. It is the theory of price pyramiding. Cotton passes through a number of distinct stages in its route from the mill door to the final consumer. They include the spinning and weaving, the dyeing and finishing, the fabrication, sometimes the wholesaling, and the retailing. Along this route, a pound of raw cotton is typically multiplied from five to 10 times in value by the time it reaches the retail counter. To some extent, it is the practice of management to fix selling prices by applying a percentage mark-up to buying prices. If percentage mark-ups are rigidly applied, as the theory holds, the effect of a price rise in raw cotton is multiplied along the route from producer to consumer, so that the increase tends to become as big a fraction of the retail price as it was of the raw cotton price. Thus a price rise of one cent in the cotton used for a shirt might produce a rise of five or 10 cents in the shirt that you buy.

If we can assume that business firms make reasonably intelligent efforts to maximize their profits, the pyramiding theory is not acceptable. If a converter, for instance, has tried to maximize profits before a rise in the cost of gray goods occurs, it is difficult to see how the increase in cost will give him the ability to raise his selling price by an amount considerably in excess of the cost increase, thus adding to his profit. If he has strong competition, the rise in gray goods cost may permit an equal rise in the selling price, but no more. If he tends toward monopoly and has previously set his price intelligently, he may find it difficult indeed to recoup even his increased cost by raising his price.

To this reasoning, the exponents of price pyramiding may reply with the formidable fact that nevertheless many firms, including the retailers, do actually have percentage mark-up policies. It is presumably true that raw cotton price increases are accompanied, to some extent, by percentage mark-ups in processing and distributing. But we have here the familiar tendency to assign a cause and effect relationship where the facts only prove a correlation. In general, cotton costs tend to go up when other costs, including that of labor, go up also and when general business conditions are gaining strength. If a textile processor or distributor can get away with increasing his selling price by more than the

increase in his raw material cost, it is because his other costs and those of his competitors have also tended to rise and/or the demand for his product has become stronger.

It should be noted also that actual experience does not bear out the notion that percentage mark-ups have been maintained very completely and rigidly over a span of years. If such had been the case, the price of raw cotton would bear a constant relationship to average retail prices. L. D. Howell's work shows, however, that over the past two decades that relationship, in apparel and household articles, has varied from five to 13 percent.

The theory of price pyramiding in cotton warrants more study than it has received, to my knowledge. On the evidence as it now appears, however, I am inclined to dismiss the pyramiding theory as being of little validity. Price changes in raw cotton may be accompanied by much greater price changes at the retail level, but they do not cause the greater changes. My position remains that price changes in raw cotton tend to have only a minor influence on retail price, and therefore exert little influence on the total volume of fiber consumption.

We turn now to the more significant way in which price affects the quantity of cotton purchased; namely, by the substitution of one material for another. I believe it is unnecessary to belabor this audience with evidence that in the textile market the competition among raw fibers is a strong and dynamic force. This fact very properly holds a large place in most analyses of the future of cotton. The dynamic competitors of cotton include rayon, paper, nylon, Fiberglas, Saran, and Orlon, not to mention the competition of U. S. cotton with the foreign grown. The impact of competition is different in each of the numerous end use markets which cotton serves; in every case the three great competitive factors of quality, price and merchandising require separate analyses. In all cases the balance of competitive advantages has a tendency toward continual change. It is in this vast, complex, and changing competitive situation that the market imposes its principal requirements as to price.

There are many different concepts of the elasticity of demand as a function of price change in cotton. The differences turn on (1) what form of disappearance is considered (raw cotton purchases, mill consumption, or purchases by consumers of the final products), (2) whether a seller's or buyer's market is taken to prevail, and

(3) what assumption is made as to the span of time in which the effects of price changes will run their course. An effort will be made now to define the conditions of demand distinguishing what seem to be the five most common concepts of demand elasticity and to comment on their relative significance. For convenience I shall assign the following titles to these concepts:

I. Short-run Demand for Raw Cotton.
II. Demand under Conditions of Inflexible Fiber Supply.
III. Demand under Conditions of Market Equilibrium in Fibers, with a Buyer's Market in Textiles.
IV. Demand under Conditions of Market Equilibrium in Fibers, with a Seller's Market in Textiles.
V. Demand in the Long-run.

I. *Short-run Demand for Raw Cotton.* Naturally the mills and merchants are influenced by price in deciding when to increase or reduce their holdings of spot cotton and when to make long or short forward commitments. In a study of this subject some years ago, Dr. Howell[1] found the demand in this short-run sense quite elastic. This is what one might expect. This tendency of the mills and merchants to respond to price changes presumably serves as a restraint on price fluctuations, which are certainly wide enough in any case. We are chiefly concerned, however, with the effect of price on ultimate consumption. The short-run differences between raw cotton purchases and ultimate consumption of equivalent cotton products are obviously transitory, and in the long-run must largely disappear.

(At this point we should note two other short-run concepts of demand elasticity, which are not being discussed here because they are not designed to give accurate reflection of ultimate consumption. One is the relation of the raw cotton price to mill consumption. This has received a good bit of attention, particularly by Howell. The other is the relation of the price of gray goods to the purchase of gray goods. This was treated in the recent work of Martin and McLure, *Market Outlets for Cotton in Some of the Principal Cotton Fabrics.*)

II. *Demand under Conditions of Inflexible Fiber Supply.* If a high price for cotton gives a competitive advantage to another fiber, the question arises: Is the other fiber actually available in adequate

[1] L. D. Howell, *Cotton-Price Relationships and Outlets for American Cotton*, USDA, Technical Bulletin, No. 755, January 1941.

supply? If a low price gives cotton a competitive advantage in a given market, we have the converse question: Will production of the fiber now holding that market actually be reduced, or will not production be maintained and the price lowered, so that the fiber continues to give effective competition either in that market or in some other?

These questions suggest that the short-run effect of a price change upon the volume of ultimate cotton consumption may not be very great. Only when, and if, the production of other fibers reacts to the price change in cotton, does an elastic demand schedule in this sense become possible.

This concept is of a short-range nature, but not so much so as we might suppose. There are great obstacles to fast adjustments in the supplies of competing fibers. The present difficulties of foreign growers in regaining their prewar production stride will not soon be overcome. The rayon industry normally operates at approximately full capacity, so that increased production must await plant expansion. Once expansion is accomplished, the overhead costs of rayon production make it hard to reduce operations. Presumably these characteristics are also to be found in the production of other synthetic fibers.

Thus it is that over very substantial periods of time, the demand schedule for cotton may be quite inelastic because of the inflexibility in competing supplies. As economists we may dislike this situation, but as realists we must recognize it.

III. *Demand under Conditions of Market Equilibrium in Fibers, with a Buyer's Market in Textiles.* This concept is based on assumed conditions which never quite exist; yet I believe it is the most commonly accepted and the most useful concept of demand elasticity for cotton. At least it approximates the assumptions which were considered most appropriate by the steering committee of the project dealing with cotton's competitive position on the domestic market, in the well-known Cotton Fact-finding Program of 1945–1947. No effort is made to envision any general economic equilibrium among fibers, but an effort is made to estimate the quantities of cotton that would be consumed in every end use market if the competitive positions of the various competing materials had an opportunity to come into a state of equilibrium on the market under assumed conditions of price, quality, and merchandising efficiency, with adequate supplies of all materials. In the project

mentioned, it was assumed that the price, quality, and merchandising relationships existing in early 1946 would continue. Wherever there was a market for any fiber, under that relationship, it was assumed that adequate supply would be available. Where the adoption of a new fiber for a given use required machinery adjustments, labor adaptations, advertising campaigns, etc., it was assumed that all those problems would have been overcome.

Under buyer's market conditions, which the project committee assumed, the responsibility for fiber selection tends to focus on the final consumer, though an influence is always exerted by the processors and distributors. (To some extent the final consumer does not even know what fiber a product contains.)

With these assumptions, among others, this committee of textile economists estimated the quantity of cotton that would be consumed annually on the domestic market at several different prices. For every important use the committee drew upon the available statistics and literature, upon the knowledge of its own members, and upon the results of a great many interviews with executives and merchandising experts engaged in practical processing and distributing operations. The findings of the committee are not subject to statistical proof; they necessarily involve a large element of judgment, in which the committee members were the first to point out the possibility of error. Yet these findings reflect the only serious and comprehensive effort which has ever been made to delve into the real subject matter of cotton's competitive position in every important use, and to develop therefrom an overall estimate of demand elasticity on the domestic market.

The committee found marked elasticity of demand for cotton in tire cord, bags, and a number of other industrial uses, but a decided inelasticity in the great apparel and household markets, which are larger in the aggregate than the industrial uses. In the sum of all domestic markets combined, the evidence is on the side of inelasticity. The committee's findings can only be interpreted in the light of today's market conditions by means of adjustments that are very crude indeed. We must ignore shifts since 1946 in relative quality and merchandising. The price level assumed by the committee was approximately 30 percent lower than that of today, and the industrial production index was about 25 percent lower. Adjusting for these two factors, the findings can be interpreted to mean that, under the other conditions assumed, there

would be in the United States today an annual market for about 10.2 million bales of cotton at 35 cents a pound or for about 12.7 million bales at 17 cents. Remember that these figures reflect the recent level of industrial production, which is the highest on record except for the World War II years. Ignoring quality and location differences, we can say very roughly that the farmer's gross income from cotton lint on the domestic market would be approximately 65 percent greater at the higher price than at the lower.

I have particular reservations, however, about the validity of the findings under the price corresponding to 35 cents a pound. The committee did not allow fully for the significance of fiber blending in markets where cotton has a quality advantage but rayon a price advantage. I am of the opinion that if rayon held a distinct price advantage, as it would with cotton priced at 35 cents, cotton's market losses through blending would be greater than those envisioned by the committee. Consequently I think it is wise to adjust the assumed price of cotton downward to 30 or 31 cents, which roughly would mean effective price equality with rayon at today's price of 36 cents for viscose staple. With cotton at 30 or 31 cents, its domestic market under the other assumed conditions would tend to be at least the 10.2 million bales indicated above, or perhaps more, and the farmer's gross cotton income from the domestic market would still be at least 40 percent greater at this price than at 17 cents.

Let us note in passing that in actual practice we cannot ignore the export market, though it is outside of my assignment.

IV. *Demand under Conditions of Market Equilibrium in Fibers, with a Seller's Market in Textiles.* The distinction between this concept and the preceding one is that here a seller's, not a buyer's, market prevails in the manufacturing stages of the cotton industry and also in the wholesaling and distributing stages for cotton products. When the buyers, including the final consumers, are disposed to take whatever they can get, the responsibility for selection of fibers tends to move away from the final consumer and back in the direction of the merchants, the fabricators, the converters, and the cloth manufacturers. The processors and distributors are freer to shift from one fiber to another in order to gain an advantage in unit profits. Quality becomes less important and price more important.

I mention this concept because I have encountered it a good

many times, but its usefulness is limited by the fact that when a buyer's market prevails in textiles, there is a likelihood of a buyer's market also in textile raw materials. In those circumstances the cloth manufacturers themselves, on the whole, are obliged to take what they can get, so that their theoretical opportunity to exercise fiber selection is not very realistic.

V. *Demand in the Long-run.* When we try to envision the competitive position of cotton under any assumed conditions, we must always realize that those conditions are subject to change. The world of fiber competition is remarkably dynamic. The price, quality, or merchandising relationships of cotton with its competitors may be quite different in the future from what they are today or from what we would regard as normal today. These three factors—price, quality, and merchandising—all react upon one another. Price is by no means the only factor capable of setting in motion shifts in the competitive positions of fibers. If in coming years cotton should have to contend with great quality advances in rayon and other materials, and if cotton should not be reinforced by offsetting quality advances of its own, the demand schedules that we envision today for cotton would have to undergo drastic revisions. They certainly would have to come down. In a very real sense, there is a long-range elasticity of demand for cotton in response to quality change, as distinct from price change. The great struggle for quality superiority among fibers and fiber products, which is in progress today, is going to continue on a big scale regardless of what happens in the field of price.

I hope it will be clear in the following discussion that I am not discounting the importance of cost reduction as compared with quality improvment. I think cost reduction is of utmost importance to the future of cotton. In this paper I give more attention to quality improvement than to cost reduction because I am discussing the forces that alter the demand schedule.

This fifth concept should not be mistaken for an effort to envision what a more short-run demand schedule will be at some future time. I certainly do not mean to say that the short-run demand schedule won't be lower at some future time than it is today. In that case lower costs will be essential. In any case lower costs will be important.

The question here, however, is the effect of the present cotton price on the various long-range forces that may change the com-

petitive position of this fiber, including the research program devoted to quality improvement. This long-range effect of price upon the quantity of cotton to be consumed is one of the most important and most frequently cited concepts of demand elasticity. Let us comment on four different aspects of the matter.

(1) It is felt that a high price for U. S. cotton tends to give the producers of other fibers and of foreign cotton a greater confidence in the future of their own products and thereby encourages them to invest more heavily in production capacity. This would have a tendency to necessitate lower prices for the competing fibers. The supply of fibers is tied to such long-range commitments and is so difficult to adjust, that it is always likely to be too great or too small, and if it becomes too great the price must come down. Suppose the price of cotton should encourage the domestic rayon industry to double its capacity. Suppose it then developed that the rayon industry had over-shot its market and could not find outlets for all its new production. The new plant capacity would remain nevertheless as an irrevocable factor in the market. It would be costly to leave plants idle. It would also be difficult to operate them at less than capacity, since the individual rayon plant is characterized by a decreasing cost curve. There would be strong pressure to maintain production by reducing prices, even perhaps below costs. Revising the price structure of rayon would profoundly affect the the competitive position of cotton.

The question is how much, and in what way, the price of cotton actually does influence management's decisions on plant expansion. Do the directors of a rayon company take the current price of cotton as a major consideration in deciding whether to build a new plant? I am not implying an answer, because I do not know the answer. But I submit that the really important consideration would be not what is the price of cotton now, but what is the price of cotton going to be over that long period of the future, beginning perhaps two years from now, while this rayon plant is in production. The progress that is being made in research and education to lower the cost of growing cotton may be more meaningful than the current price to a rayon management in that situation. More meaningful also than the current price would be how readily the price could be adjusted downward at some future time in order to meet new competition.

The international aspects are outside the scope of the subject

assigned me; they will be discussed later by one of the foremost authorities in that field, Mr. E. D. White. We merely note here that the long-range effects of price on foreign rayon and cotton production cannot be ignored. Rayon's current price advantage in some foreign locations may have serious long-range implications. Rayon is expanding in foreign production more rapidly than cotton. In general, the effects of price as a motivation for rayon and cotton expansion in foreign countries are complicated by the scarcity of dollar exchange, by the world-wide drive for national self-sufficiency, and by the pressure of population upon food supplies.

(2) A second aspect is the long-range effect of the cotton price upon the research and promotional efforts of industries supplying other fibers. It is sometimes said that a high price for cotton stimulates research and promotion on competing materials. But I think it is at least fair to ask, if the price of cotton really stimulates these efforts, whether the stimulation would be expected to come from a high price or from a low price. If rayon management expected a low price of cotton, and thus tougher competition, would that expectation lead rayon to feel that the need for research and promotion was reduced—or increased? In either case we may also ask whether this type of influence is not overshadowed by other influences, such as the competition of one rayon maker with another and such as the basic realization of management that in fiber markets research and promotion are vitally important. The decade of the 1940's, with relatively high cotton prices, has undoubtedly witnessed the greatest absolute volume of investment in research and promotion on other fibers. But we must remember that the decade of the 1930's, with its relatively low cotton prices, brought a widespread increase in industry's interest in fiber research, and great percentagewise expansions in industrial appropriations for that purpose, in spite of relatively low corporate profits and low corporate tax rates. It was in that era of low cotton prices that du Pont made the big research investment which produced nylon. It was in that era that industry brought forth Vinyon, Saran, and Aralac, among others. It was in that era that the rayon industry developed high tenacity yarn, which is now so significant in the tire cord market, and many other improvements which have greatly strengthened the competitive position of that fiber.

(3) A third aspect of this subject is the belief that a low price for cotton, over a number of years, would have the effect of opening up vast new uses. Most ideas for big new uses are necessarily predi-

cated on the assumption of a low price. I think it is true that research and developmental efforts on new uses are generally discouraged by a high price, though the instability of the price may be a greater deterrent than its absolute level. I am not one to discount new uses; I hope never to lose my enthusiasm over each remote possibility that arises. "Hope springs eternal in the human breast." But the idea of new uses has been discussed and explored and promoted by innumerable people for many years, and yet since the advent of pneumatic tires, the new uses for cotton have been a relatively small factor in the market. New uses have been very elusive under both low and high prices. Of course we could find new uses for cotton if we priced it to compete with cheap nonfibrous materials, but this would hardly make economic sense. We could undoubtedly open a big new outlet by pricing cotton to compete with the present sources of chemical cellulose, chiefly woodpulp and cotton linters. I believe that untold thousands of people, gifted with more imagination than realism, have at times been intrigued by this latter idea. But the great economic utility of cotton rests not so much on its cellulose molecules or chain polymers (superior ones, to be sure) but on the artistry with which nature binds those molecules together in the form of a fiber. It would be economic nonsense to take the cotton fiber, break it down chemically into its molecules, and then set about chemically to build the molecules back into another fiber, which was then inferior for most uses to the cotton fiber with which we started. Those processes have their cost. Growing the cotton fiber has its cost. If we are going to stand the cost of growing the good fiber that cotton is, let us realize that the economically sound market for that fiber is the fiber market.

For cotton, the prospect of some new use that will set its market upon a course of new, dynamic expansion is not one for which we can afford to hold our breath. Those of us who have worked closely with cotton utilization for many years have learned that preoccupation with new uses is the trade-mark of the dilettante. We have learned that cotton is capable of great, dynamic market expansion, but that the determining factors of over-towering importance are these three:

(1) The growth of population;
(2) The growth of per capita income;
(3) The competitive position of cotton within existing uses.

We have had great gains in (1) and (2), and for cotton offsetting

losses in (3). If cotton had merely held its pro rata position within existing uses over the past 20 years, the expansion of population and per capita real income would have brought the annual domestic consumption of this fiber during the past few years to an average level of 12 million bales or more (assuming the mills could handle it). If cotton could stabilize its general competitive position within existing uses from now on, the further growth of population and real income probably would carry it to vast market expansion in the future. The key to great losses or great gains in cotton consumption is not new uses but existing uses. And the key to existing uses is not price alone but the interplay of price, quality, and merchandising. Of these three factors, perhaps the one least understood by economists is quality. It is a vast and far-reaching subject. It has different aspects at every stage of production and processing. In the finished cloth (which I mention because it may be less well understood here than the raw cotton) quality is understood in terms of drape, luster, dimensional stability, abrasion resistance, absorbency, and dozens of other characteristics. In each of these characteristics, the competitive balance among fibers is not static, but dynamic. It is in these fields—fully as much as in price—that the synthetics and paper have found their way to new markets. It is in these fields, certainly as much as in price, that cotton has suffered its relative losses in competitive power. The competitive balance of fibers in quality characteristics is certain to remain dynamic in the future. The synthetic fibers will continue to improve in quality. These improvements will weaken the competitive position of cotton unless offsetting quality improvements are achieved in cotton also. On its physical merits, cotton offers the hope of quality improvements that can meet this challenge. The question is whether enough investment, competently directed, will be made in that field. Here is a question of basic importance to the long-range earning power of cotton farmers. This matter of quality shifts among competing fibers within the existing uses, is incomparably more important and more urgent than that of new uses.

(4) We come then to the question whether the price is a significant factor in determining how much investment will be made in research and development to achieve better quality in cotton products. I suppose that the prospective price of cotton over a long-range future period is, and should be, one of the factors affecting the decisions of textile companies, chemical finish manufacturers, and other industrial groups, as to how much money to invest in

the improvement of cotton products. In these quarters a lower prospective price might tend to warrant a higher research investment (I say it *might*). But let us remember that regardless of the price of cotton, these industrial groups do not have an economic incentive to make a research investment in this fiber which is on a par with the research investment being made in synthetic fibers by the industrial producers of those fibers. The mills and finishers are the common processors of both cotton and rayon staple; in the main, their economic survival depends on no single fiber. If cotton is to have a utilization research program comparable with that of the rayon manufactures, a large measure of that program must come from agencies that have a basic interest in the survival and prosperity of cotton farming. The federal government has a share of this responsibility, as do the state governments and the farmers themselves. For these groups, a low cotton price would be of doubtful value as a stimulus to increased utilization research; certainly it would be secondary to other considerations. As a matter of fact, if the farmers could add a cent or two to their selling price, and invest the proceeds in a long-range program of research and development on quality improvement, the net effect over the years on cotton's competitive position probably would be to strengthen it decidedly.

On the whole we must acknowledge that the present price of cotton has some long-range effects upon its competitive position; but those effects do not lend themselves to statistical measurement and they do not seem to follow so simply and with such ruthless certainty as is sometimes supposed. The long-range effects of the present price are probably important enough to provide a strong argument against the very high prices that the demand scale will sometimes support under conditions of general fiber shortage. But I doubt whether the long-range view holds any convincing arguments against the moderately good price that would be available for some 10 million bales in this country under conditions of market equilibrium, with high national production. This concept of market equilibrium, involving adequate supplies and reasonable assumptions as to price, quality and merchandising, affords in my judgment the soundest approach to an understanding of the price requirements of the domestic cotton market. To date we have had only some pioneering work in the methodology of this approach. It is a subject that would justify a great deal of additional effort by the agricultural economists of this country.

COTTON LABOR REQUIREMENTS

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THE discussion of labor requirements for the production of cotton limits the subject to only one of the production factors. In addition, it confines the discussion to only one of the enterprises that may be found on any farm. Therefore, it should be recognized at the beginning that a paper which is limited to cotton-labor requirements will of necessity have to omit the discussion of most of the interrelationships of labor to other factors and of cotton to the other farm enterprises. Perhaps this is best, because it will allow more time for a discussion of the assigned subject and will allow the audience to read between the lines and place this rather restricted subject into its larger setting.

Cotton has long been a major American crop and has given employment to more people in its production and processing than any other crop grown on American farms. About one fourth of the Nation's farmers are in the cotton-producing states of the South, and this one crop gives employment to about 12 million people. The fact that cotton-labor requirements are high has had a definite influence on the relatively small size of farms in the South. The size of farm has been limited by the amount of cotton that a family could handle. These factors have combined to influence the total amount that any farmer could produce as well as the cost of production. In addition, the relatively low income of the average southern farmer has been influenced greatly by his low producing capacity, which in turn has resulted from the large amount of man-labor that he has had to expend in producing his major crop.

Two major considerations make it imperative that the labor requirements for producing cotton be reduced as rapidly as possible. The first of these is the simple necessity of increasing the farmer's producing capacity as a requisite for increasing his income. The second is the necessity of decreasing the cost of producing domestic cotton so that it can more readily compete with its synthetic rivals and foreign grown cotton. It is recognized that the labor required is not the only factor affecting incomes or production costs, but it is a major factor and, in addition, is the key that will unlock the ad-

justments that are necessary in many other factors. These interrelationships should become apparent in the following discussion.

As an indication of the very heavy labor requirements in the production of cotton, the latest figures from the United States Department of Agriculture show that for the period 1945–48 the average man hours of labor required to produce a bale of cotton were 182. Twenty years previously, during the period 1925–29, 268 hours of man labor were required to produce one bale of cotton. To go back still further, the record shows that in 1800, 601 hours of labor were required to produce a single bale of cotton. These figures are averages for the entire Cotton Belt, and they represent a large number of varying conditions. However, they do give a very general idea of the tremendous amount of labor involved in the production of cotton. And despite the progress that has been made to date, no other major American crop, with the possible exception of tobacco, is as dependent upon human labor in all phases of the production process as cotton.

The reduction of labor requirements from 268 to 182 hours per bale during the past 20 years indicates that progress is at last being made in solving the problems that have long kept cotton in the high labor requirement enterprise field. This progress is due to advancement in development and adaptation of power-driven machinery, to the development of improved varieties, more effective cultural practices, and to better disease and insect control. Labor requirements are also being influenced by the combination of other enterprises with cotton into farming systems where cotton is only one of a number of important enterprises.

Unfortunately, exact figures that measure the labor savings that have been effected or which may be effected when practices are more fully utilized are not available. It is possible, however, to get some idea of the extent of this progress by taking a look at labor requirements under the system as it exists in most cotton areas at present and making comparisons with what has been done in other areas; and further, observing what is possible where some of the latest experimental results are followed.

In order to make this analysis, it will be necessary to examine the various operations involved in growing cotton. The 182 hours required in the total production process can be divided about as follows:

Land preparation, planting, and cultivation..... 27 hours

Weed control	55 hours
Harvesting	100 hours

To a very large extent, previous reductions in labor requirements have been made in the group of operations listed as land preparation, planting, and cultivation. The substitution of tractor for mule power, which has been taking place at a fairly rapid rate throughout practically all of the Cotton Belt, has been a major factor in reducing the labor required in these operations. However, the tractor is being used to a very large extent to perform those operations that are easiest to mechanize; that is, tractor equipment is used to prepare the land, plant the seed, and cultivate the crop. Tractors and equipment are available to perform these operations in a very satisfactory manner on all except the very small farms. A study which has been recently completed in Mississippi indicates that farms with as little as 30 to 40 acres of land in cultivation can afford to own a small tractor. The use of tractor power makes it possible to mechanize completely all preharvest operations except chopping, and reduce the man hours from 27 to five per bale.

This is certainly an important step in the reduction of labor requirements for cotton production. However, the two remaining operations of chopping and picking are the ones that use the greatest amount of human labor; and, furthermore, these are the operations that make direct use of this labor. The only tools required are a hoe and a cotton pick sack. The performance of these two operations requires an average of about 155 hours of labor per bale of cotton. Through the years there has been very little reduction in the labor requirements for chopping and picking, and it is quite obvious that very little progress can be made in the further reduction of labor requirements for cotton production until some means can be developed that will make it possible to mechanize these two operations. The reductions which have been made in the past are those which have been made possible by higher yields.

The chopping, or hoeing, process has always been done with hand labor, and so far not much progress has been made in changing this situation. A few years ago the flame cultivator had distinct promise as the answer to the weed-control problem. However, subsequent experience has demonstrated that the flame weeder has many limitations. The flame cultivator is, however, a very good tool and will do a satisfactory job of controlling weeds and grasses in cotton after the plants become large enough to withstand the flame

without injury. This places the producer in the position of having to keep enough labor to hoe his crop twice or to depend on seasonal labor that is not always available at the critical time period; and in order to maintain a satisfactory labor supply on the farm it is necessary to provide additional employment during the remainder of the year. Consequently, most farmers have decided that until they have some means (either chemical or mechanical) of doing a complete job of weed control, they will continue to use hoe hands for this purpose.

During the past several years, a great deal of effort has been put into a research program in an effort to develop chemicals that would control weeds and grasses in cotton. There is a great deal of evidence to indicate that considerable progress is being made. However, about all that can be said at this time is that the results have been very encouraging. Experimental results show that a combination of chemicals for early weed control and the flame cultivator for late weed control may prove to be very satisfactory under field conditions favorable to these practices.

The use of this combination in several experiments has resulted in the reduction of labor requirements for weed control from 55 to about four hours per bale. There is every reason to believe that a reduction of this magnitude is entirely feasible and indeed should become practical within the next three to five years.

The other operation that uses a large amount of hand labor is the harvesting process. It has always required more labor to pick a bale of cotton than is necessary to perform all of the preharvest operations. Inventors and other researchers have been working for over a hundred years to develop a mechanical cotton picker. However, it was not until about 1940 that a machine was made available that would do a practical and economical job of harvesting cotton. Since 1940 many improvements have been made in the cotton picker, and it appears that it is only a matter of time until a satisfactory mechanical harvester will be available for practically all cotton areas. There are still many adaptations and improvements to be made; but the fact remains that a picking principle has been built into machines that do a satisfactory job of picking cotton. These machines have been given exhaustive tests during the past eight years, and four different companies have cotton pickers on the market at the present time.

It is true that these pickers are large, cumbersome, and expen-

sive. They are not practical on small farms and likely will not be for some time in the future. The waste cotton that is left in the field is excessive in many instances, and the cotton picked is not as clean as hand-picked cotton. However, in spite of these difficulties, the mechanical cotton harvesters that are now available can pick a bale of cotton in from two to three hours; whereas ordinary hand methods require an average of 100 hours. One cotton picker with an operator can harvest as much cotton as 40 average hand pickers.

From an economic standpoint, the cotton picker is quite feasible in the large-farm areas where it is being used. In 1947 the average cost of picking a bale of cotton in the Mississippi Delta with a mechanical harvester was $18.23. The average volume was 109 bales per picker. Machines that picked over 100 bales and averaged 137 for the season had an average cost of $16 per bale. This includes variable costs of $8.81 and fixed costs of $9.42. These are the operating costs and compare with about $45 per bale for hand picking. However, in analyzing the comparative economies of machine and hand harvesting, the grade loss and waste in the field are often as important as the actual cost of operating the cotton picker. These items are quite controversial and are hard to measure. There is not time to give a thorough discussion in this paper, but it should be said that the grade differential between hand- and machine-harvested cotton is gradually disappearing. The lint cleaner, about which there is also considerable controversy, makes it possible to get almost as good grades from machine-harvested as from hand-picked cotton. Also, continual improvements in the picking machine should gradually eliminate the field loss. The economic force that results from a labor reduction from 100 hours to two to three is so great that the remaining difficulties in the machine harvest of cotton will receive major attention and should be removed in a relatively short period of time.

The above analysis indicates that it may be possible during the course of the next five to 10 years to reduce the number of man hours involved in the production of a bale of cotton from 182 to a range of 20 to 30 hours. Under a completely mechanized program, it is conceivable that man-labor requirements could be reduced to as low as 10 hours per bale in those areas that produce an average of one bale per acre.

Perhaps at this point the importance of a relatively high yield per acre in mechanized cotton production should be emphasized,

especially in areas where the mechanical picker is to be employed. Very roughly speaking, cotton yielding one-half bale per acre would require approximately twice as many man hours per bale as cotton yielding one bale per acre. Therefore, in addition to the mechanization factor, an array of other factors must be effectuated if the projected low per-bale labor schedule is to be widely realized. Factors for high yield include selection of productive soil, adequate fertilization, proper varieties, effective control of diseases and insect pests, and good farming practices throughout.

The continual reduction in labor requirements for cotton will mean major shifts in the farm population of most areas in the South. This is a large subject and is probably not within the scope of this paper. However, it should be emphasized that as labor requirements are reduced, there will be a progressively smaller number of people required to operate any given acreage of land. As tractor power and other labor saving practices and devices are substituted for human labor, many farm workers will have to find remunerative employment in speciality crops, expanded poultry and dairying, and in occupations other than farming. From the standpoint of the individuals who remain on farms, it should mean a higher standard of living and increased production for the total economy. This is true because the total income from the agricultural plant will be divided among fewer people and those that leave the farm will be more fully and effectively employed. It is also quite probable that the total production of the agricultural plant will be increased by the production adjustments that take place. Each person who remains in agriculture will therefore he able to increase his producing capacity significantly; and since this total product will be shared by considerably fewer people, per capita farm incomes will be thereby increased.

The amount of this increased income that will be net income will depend on the extent to which efficiency attained in the use of the capital (in the form of machinery, better seed, and labor practices generally) is substituted for labor. Another factor that will affect the rate of substitution as well as its profitableness is the prevailing wage rates. Since the early 1940's there have been sufficient alternative employment opportunities off the farm to absorb much of the labor released by the adoption of mechanical equipment and improved labor saving practices. The present war situation is such that there will probably be relatively full national em-

ployment and accompanying high wage rates for some time to come. This should mean that farm labor can continue to shift to other employment at a rather rapid rate as farm machinery and other adjustments release this surplus labor from the cotton farms of the South.

As a matter of fact, the South provides the only important potential labor supply that will be needed to superimpose upon our already very high level of economic activity in the war economy that seems to be in prospect.

Fortunately, at this time a sufficiently broad base of fundamental information is now available to make significant reductions in cotton-labor requirements as we move into these eventful years. These reductions can be as much as 70 to 80 percent. General economic conditions will in important measure determine the rate at which the reduction will take place. There are many indications, however, that a major part of this reduction will be made within the next 10 years under conditions which now prevail.

Hence, the next few years may be by far the most significant yet, in terms of farm adjustment in the old Cotton Belt and in terms of the evolution of a mechanized, efficient farming system.

WORLD PROSPECTS IN COTTON

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AS I SAT through the sessions of the ninth plenary meeting of the International Cotton Advisory Committee held in Washington during May of this year, it seemed clear that the cotton producing and consuming nations of the world were more concerned about the economic disequilibrium in the world today as it related to cotton than they were about the more usual international aspects of the world cotton situation. The usual complications of the cotton situation have been compounded as a result of the world-wide dollar shortage. The lack of dollars with which to buy ample supplies of American cotton has caused foreign cotton consuming countries to create new patterns of trade. This has resulted in increased demands upon foreign cotton producing nations for more cotton at continually increasing prices. These countries have responded by making special efforts to expand cotton production in order to take advantage of the developing and lucrative export business.

The lack of dollars with which to buy American cotton has also resulted in enlarging synthetic fiber programs in cotton consuming countries. The upswing in cotton prices throughout the world has created increased interest in new rayon plants as sound investments. Furthermore, raw materials for the manufacture of rayon staple fiber can easily be obtained without the use of scarce American dollars. Consequently, rayon production in the more important cotton consuming countries has expanded rapidly.

I do not care to prophesy what the future may hold. Yet certain definite trends in cotton are clearly discernible and they tend to persist despite economic dislocations. So, I should like to think through with you some of the long range trends that give definite insight into the world prospects for cotton.

What's Happening to Production

Let's take a look first at production. During the five-year period prior to the first World War, the world produced on the average about 21 million bales of cotton a year. Of this amount about three fifths was produced in the United States. During the follow-

ing 15-year period world cotton production increased almost 30 percent and the United States' share of the world production declined from 60 percent to 56 percent of the total world crop. In the years following, the production of cotton continued to increase so that by the beginning of World War II production averaged slightly more than 30 million bales per year, an increase of approximately 50 percent over the amount of cotton produced immediately prior to World War I. Such was the history of cotton production up to the beginning of the last World War. During the second World War, the production of cotton declined—principally because of two reasons. The effective sea blockade maintained by the Allies made it practically impossible for producing countries to deliver cotton to the spinning mills in Europe. The shortage of shipping made it difficult for the cotton producing nations to obtain their usual food imports. Consequently it was necessary to shift a large portion of the cotton acreage to food production. The combination of these factors resulted, by the end of the war, in a world cotton crop of only about 21 million bales, about the same size crop as before World War I. At the close of the war in 1945, cotton production began to expand again. At first the rate of expansion was slow, due probably to the difficulty farmers had the world over in converting quickly to a different farming system. In the first year or two the rate of increase was less than 10 percent. However, within two or three years after the war substantial increases in production got under way. Especially was this true in the United States. By 1949 world production of cotton had regained its prewar position. The crop amounted to 31 million bales, slightly more than half of which was produced in the United States. That has been the situation from the world standpoint. Now let us take a look at what has happened in the more important cotton producing nations. Let's start with the United States.

United States

The intermittent application of stringent and effective cotton production control programs has resulted in extreme fluctuations in the size of the American cotton crop since 1933. The crop has varied from less than nine million bales to nearly 19 million bales. However, the average size of the crop over any representative period of five years has remained very close to 13 million bales—the average size of the crop prior to the first World War. Although

the average size of the United States cotton crop has remained about the same, the acreage planted to cotton has decreased greatly. The decrease in acreage, however, has about been offset by substantial increases in yields. During the past 20 years the average yield of cotton in the United States has increased from approximately 170 pounds of lint per acre to approximately 270 pounds or about 60 percent.

India and Pakistan

India and Pakistan comprise the largest area of cotton production outside the United States. Prior to the partition in 1947, the two countries were united as one—India. In the five years before World War II, India produced on the average about 5.3 million bales of cotton annually or about 17 percent of the world production. After the entry of the United States into World War II cotton production in India declined rapidly. It was practically impossible to transport Indian cotton to China and Japan, or to Europe on account of the effective sea blockade. In the first year after America entered the war, the acreage of cotton in India declined by about 20 percent and by the end of the war in 1945 the cotton acreage had declined by about 45 percent. Production likewise had been cut almost in half—from 4.4 million bales to about 2.5 million bales. Most of the reduction in acreage was in the area now comprising the Indian Union. The prewar cotton acreage in what is now Pakistan was about 3.6 million acres. It did not decline during the war but has some since. It did not fall below 3 million acres, however, except during 1947, the year of the partition, when the acreage was 2.7 million acres.

The governments of both India and Pakistan are sincerely interested in expanding cotton production to an area approximating the prewar acreage. Thus far, little progress has been made in this direction because of the pressure of the people upon the land for food production. Gaining political independence in each of these countries has created a stronger will on the part of the population to produce more food for local consumption and less raw material such as cotton for export. No doubt cotton acreage in each of these countries will be increased some in the future. Whether or not the prewar acreage will be regained cannot be foretold. It is more likely to be regained in Pakistan than in India for the reason that the reduction in cotton acreage has been less there and also for the

reason that food production in Pakistan is more ample. Pakistan is now exporting some wheat.

If India and Pakistan should again recover the 1941 level of cotton production there would be an increase of about 2.5 million bales, over half of which would be short staple cotton produced in India. All of the increased production in Pakistan would be available for export but only about half of the increase in Asiatic short staple cotton in India would be available for export. There has been a decided tendency in each country to shift away from the production of short Asiatic type cotton to American upland type. Progress in this direction has been slow in India, but in Pakistan substantial progress has been made. It is estimated by the Pakistan government that at least four fifths of the cotton now produced in Pakistan is of the American upland type.

China

China is generally considered the second largest area of cotton production outside the United States with Russia closely in third place. In the five-year period prior to the Second World War, the production of cotton in China averaged about 3.1 million bales per year. This was about enough cotton to meet Chinese requirements. With the Japanese occupation of China cotton production began to decline. By the end of the war, cotton production in China had decreased by one third and during the post war period has averaged slightly less than two million bales of cotton yearly. Last season cotton production was only 1.7 million bales and is not likely to be greatly enlarged this year. From the standpoint of the long-time trend, cotton production in China should continue to expand until enough cotton is produced to meet Chinese requirements. Before this desirable objective can be achieved, there will need to be at least a greater semblance of peace in this war-torn country.

Russia

Prior to World War II, Russia ranked third in cotton production outside the United States. The average annual production amounted to about three million bales of cotton per year. This accounted for about 10 percent of the world cotton production. As elsewhere in the world, cotton production in Russia declined substantially during the war years; but since the end of the war, pro-

duction has tended to increase. During the postwar period Russia has produced about the same percentage of the world cotton crop as before the war. Last year the crop amounted to about 2.7 million bales.

Russia has had many plans to expand cotton production and each one has been a limited success. With over 180 million people to clothe and with a very small amount of wool produced, less than three million bales of cotton is indeed a small amount of fiber to meet Russia's requirements, especially when this small quantity must be divided between Russia and her eastern satellites. It is only logical, therefore, to expect more plans in Russia to expand cotton production; but with the northerly latitude, limited water availability, and a general lack of interest in cotton cultivation by the inhabitants of the collectivist farms, only limited success should be expected.

Egypt

Egypt is next in order of magnitude of cotton production. Here it is less variable than in most cotton producing countries. Egypt generally accounts for between five and six percent of the world cotton crop. Prior to the Civil War in the United States, cotton was grown in Egypt mostly for home spinning. Wheat was the main crop. Because of the blockade of the South Atlantic and Gulf ports during the Civil War and the resulting scarcity of cotton for the spinning mills in Europe, commercial production of cotton in Egypt began on a large scale. During the next 50 years cotton production in that country expanded. It went up to the limit that the pressure of the population on the land would permit from a food standpoint. Cotton exports from Egypt are important. They generally account for between 75 and 80 percent of the total export trade. Cotton production is now completely stabilized and is limited to that portion of the Nile Valley that can be irrigated by the diversion of water from the Nile river.

The production of cotton in Egypt last year amounted to 1.7 million bales and represents an average crop during a normal period. When there is a strong demand for long staple $1\frac{1}{2}$ inch cotton, more than half the Egyptian crop is planted to this type of cotton. When the demand for that type of cotton is somewhat unfavorable, more than half of the Egyptian crop is of the shorter staple Ashmouni and Zagora varieties. These varieties have a staple length from one inch

to $1\frac{3}{8}$ inches in length. The current trend is toward the shorter staple varieties.

Brazil

Brazil has been a surprise to a great many people in the cotton business. In the early 1930's many folks thought that Brazil could and might rival our own cotton belt. Cotton production during that period did increase rapidly. Production expanded from an average of about half a million bales during the period 1924–1928 to 1.75 million bales during the five years prior to the second World War. This is an increase of about 250 percent and it represented slightly over five percent of the world cotton crop at that time. Since then production of cotton in Brazil has been well stabilized as regards her share of world cotton production, always remaining around five to six percent. Last season the crop amounted to 1.7 million bales. Coffee is a strong competitive crop with cotton in Brazil. This coupled with a somewhat poor soil has effectively held cotton production in check in Brazil. While the Brazilian crop may in the future tend to increase in response to high prices—and these are currently offered for Brazilian cotton—it is unlikely that Brazil will over any substantial period exceed the previous peak reached in cotton production 10 years ago.

Mexico

Mexico is still regarded by comparison a small cotton producing country, but the production of cotton in Mexico is expanding rapidly. There are abundant soil and water resources for further expansion. With the high prevailing prices for cotton in the world today, and the favorable prospects for continued high prices in the near future, cotton production in Mexico is most likely to continue to expand. Cotton production in this country rose from a 300 thousand bale crop in the late 1930's to a 600 thousand bale crop in the late 1940's, and to slightly more than one million bale crop in the early 1950's. With good soil resources and a favorable climate, Mexico will be regarded in the future as one of the principal cotton producing and exporting nations in the world.

Turkey

While cotton has been produced in Turkey for a long time, it is only in recent years that Turkey has been considered a cotton ex-

porting nation. Turkey, like Mexico, has favorable opportunities for further development of cotton production. Her rich soil resources, coupled with available water supplies and favorable climate, give promise of an expanded cotton production in that country. It is likely that cotton production could be almost doubled on the present cotton acreage if more attention were given to improved cultural methods and better insect control. If this were done, Turkey would be producing between .75 and one million bales of cotton; and if her resources were adequately developed, production might again be doubled.

The eight countries just enumerated account for over 90 percent of the world cotton crop, even though 58 nations of the world produce cotton. The remaining 50 countries thus far have found it difficult to expand cotton production substantially. When viewed from the standpoint of land resources, labor supply, and favorable climate, substantial increases in cotton production in these countries would not generally be expected.

The world production trend in the future is almost certain to be in the direction of increases vertically instead of horizontally. The pressure of the population upon the land for food, the limitation of favorable soil resources, and the restrictions of climate will definitely limit cotton production to certain areas. Large increases in yield per acre have already been achieved in some countries and, in most countries of the world, further large increases can reasonably be expected.

Due to the availability of large areas of land well suited to cotton production and to an ample labor force greatly interested in producing the crop, the United States promises to remain long the leading producer of cotton in the world unless limited severely by national legislation or hampered by the loss of export markets. Without these two limitations, the United States could reasonably be expected to produce over any period of years at least 50 percent of the world cotton crop.

What's Happening to Consumption

With that brief review of production trends, let's note a few of the more important developments in cotton consumption. A fairly continuous expansion in the consumption of cotton and cotton goods occurred throughout the world until the outbreak of World War II. Mill consumption of cotton increased from an average of

20 million bales during the five-year period prior to the first World War to an average of about 28 million bales during the five year period prior to the second World War—an increase of about 40 percent. The peak level of cotton consumption of 30.6 million bales occurred in 1936.

During the 20-year inter-war period, the standard of living increased materially throughout the world and this was translated into increased uses of cotton. During the second World War drastic changes in the uses of cotton occurred in many important world regions. On the whole, cotton consumption declined greatly. From the peak of 30 million bales reached just prior to the outbreak of war, world consumption declined to 23 million bales by the war's end in 1945. In some regions, however, such as the Western Hemisphere, where supplies of raw cotton were abundant, cotton consumption expanded rapidly. The same was also true in India, but elsewhere in the world cotton consumption declined greatly due to the lack of available supplies.

The war damage to cotton spindles was not excessive except in Japan and to a limited extent in Russia and Germany. Prior to the war more cotton spindles were in existence than were being used. Some were obsolete but others represented excess capital investment. Some losses in spindlage therefore did not effectively reduce previous maximum operating capacity. It is interesting to note that the reduction in cotton spindles during the war was not as great as during the period preceding the war. For example, the number of cotton spindles declined from 165 million in 1928 to 147 million in 1938 and to only 130 million by 1948. In Japan, however, the reduction in cotton spindles during the war was serious. There the number was reduced from approximately 13 million spindles to approximately three million spindles. This reduction was due to a decision on the part of the Japanese government to convert cotton spinning mills into scrap metal for war purposes.

The changes that have occurred in the mill consumption of cotton by world regions are indicated by the following facts: at the outbreak of the second World War, Europe was consuming about the same amount of cotton as 10 years earlier. Today Europe is consuming about 10 percent less than prewar. In the prewar period Russia was consuming nearly three times as much cotton as 10 years before, but today is consuming one third less cotton than at the outbreak of the war. At the beginning of the war, Asia was

consuming one third more cotton than 10 years earlier, but today Asia is consuming about one fourth less cotton than before the war. In the United States and in other parts of the Western Hemisphere, notably Mexico and Brazil, cotton consumption has continued to expand, and consumption today is from one third to one half larger than it was 10 years ago.

Outside of the United States the current and prospective cotton situation is somewhat paradoxical in the sense that, against a general background of high level economic activity, expansion of cotton consumption is proceeding at a slow rate. On a per capita basis the consumption of cotton in Europe is still more than 10 percent below prewar; in Asia it is 25 percent below prewar and in Russia it is about 33 percent below prewar. In contrast, the per capita consumption of cotton in the United States is more than one third above prewar, and in the other Western Hemisphere countries it is fully equal to the prewar level. It is notable that if the prewar per capita consumption of cotton on a world basis of 6.3 pounds was achieved, between 4.5 and five million more bales of cotton would be consumed. With the world population increasing at the rate of more than 20 million people per year, the long term trend in cotton consumption will be definitely upward, provided that political conditions throughout the world are reasonably stable and that the prewar standard of living can be regained. Should there be a relatively long period of freedom from major armed conflicts such as prevailed between 1875 and 1910, with a logically concomitant increase in standards of living, and should the underdeveloped countries of the world become more industrialized, great increases in cotton consumption would occur with adequate supplies of raw cotton available.

Outside the Western Hemisphere, the principal problem confronting cotton consuming nations today and in the future is access to adequate supplies of raw cotton. The difficulty stems from the world currency problem and until it is solved, it is not likely that a solution to the cotton problem will be found.

Production versus Consumption

Against that backdrop of long-time trends in cotton production and consumption, let's take a look at how the situation stands on balance. As we have observed already, both world production of cotton and world consumption of cotton decreased greatly during

the war years and both have increased substantially since the end of the war. But the increases have not been evenly distributed. At the end of the war, there was the largest carryover of cotton on record, amounting to slightly over 29 million bales. During the first year after the war ended, the world used 3.5 million more bales of cotton than it produced; in the second year 6.5 million more bales of cotton were used than were produced; and in the third year 3.5 million more bales were consumed than were produced. In those three years the world consumed between 13 and 14 million more bales than were produced. As a result, by 1948 the peak postwar surplus had been reduced to about 15 million bales, or down to near normal. In the following year, 1948, world production was almost equal to world consumption, amounting to nearly 29 million bales.

With the 16 million bale cotton crop in the United States in 1949, world production exceeded world consumption by about two million bales. Now, in 1950, with effective cotton acreage controls in effect in the United States and with the small crop of 10.3 million bales now in prospect, world consumption during the current season is likely again to exceed world production—and by about two million bales.

The large crop of nearly 15 million bales in the United States in 1948 went a long way toward bringing the carryover of American cotton up from an uncomfortably low position. It also aided substantially in stabilizing cotton prices in other parts of the world. At the same time, it assured foreign textile mills a continuing supply of raw material on an expanding mill consumption basis. A short American crop in 1948 would have created a severe scarcity of cotton in most parts of the world and, as a result, would have contributed significantly to inflationary pressures then in effect. When viewed broadly, the large American crop in 1948 was indeed a helpful addition to the world cotton supply situation.

The large crop of 16 million bales in 1949 was more than was needed at the time but perhaps was not as excessive as a great many people in the United States had thought. Elsewhere in the world, carryover stocks of cotton were down to near-normal positions and world cotton textile manufacturing was expanding.

The short crop in the United States this year will far more than offset any increases in foreign cotton production. The world supply

situation at the end of this marketing season can be expected to be tight. The demand this year is almost certain to outrun the available supply of all kinds of cotton in all countries of the world. Under these conditions, cotton prices are likely to remain quite firm. Next year the world production of cotton will need to expand by at least four million bales over the production that will be achieved this year, if world cotton textile requirements are to be met.

What about Synthetic Fibers

Any consideration of the future prospects for world cotton would be incomplete without appropriate reference to synthetic fibers. Although there are a dozen or more synthetic fibers, only one is competitive on a large volume basis. It is rayon. Almost everyone is familiar with the rapid advances made by rayon staple fiber during the past 15 years. There are two reasons: first—through staple fiber, rayon was made suitable for use on the cotton spinning systems, thereby the necessity was avoided for a large capital plant investment in order to use the product; and, second—through research, certain superior qualities have been imparted to rayon that render it suitable material for a number of end uses.

In the years prior to World War II the consumption of staple fiber rayon increased rapidly, and the rate greatly accelerated after the end of the war. Before the war, rayon consumption reached the equivalent of 3.5 million bales of cotton annually and amounted to about 11 percent of the world cotton consumption. At the war's end, about the same amount of rayon was being consumed, but it represented about 13 percent of the world consumption of cotton. The consumption of rayon reached the equivalent of 6.5 million bales of cotton last year. This was equal to 19 percent of the total amount of cotton consumed in the world.

The principal rayon producing nations of the world are, besides the United States, Great Britain, Germany, France, Italy, and Japan. Only in Japan has rayon failed to make rapid postwar advances. Thus far in Europe rayon has made rapid strides forward, except in Italy where the advance has been only moderate. Considering the continued scarcity of American dollars in foreign cotton consuming countries, the high prevailing price of cotton in all parts of the world and future prospects for firm or higher prices, and the free availability of wood pulp and chemicals with which

to manufacture rayon at moderate prices in soft currency, also freely available—considering all those factors, further substantial increases in rayon consumption are clearly in prospect.

Conclusion

The two factors that overshadow all others in the world prospects for cotton are: (1) the world currency problem and (2) the continuation of armed conflict and its threat of spreading. With these two factors present, so much uncertainty is created as to make the future unpredictable. When people cannot convert their money into the things they want and need, there is unrest, and unrest is the breeding ground for wars. One important job ahead, therefore, is to regain sound currencies throughout the world and build up world commerce to a more normal position. It is as much our job as anyone's. We must buy more from foreign countries if we expect to continue to sell our products to them. Foreign trade is a two-way street. There are too many one-way streets in the world today.

DISCUSSION

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Doctors Welch and Miley have done an excellent job in their paper in presenting the over-all results of some of the major technological and scientific developments of recent years that point the way to possible lower labor requirements for cotton production, lower costs of production, greater production efficiency, and higher per capita incomes for farmers in the cotton South.

The one development which probably holds the most promise for the future of the South has been the rapid adoption and increased use of mechanical power by southern farmers. However, the South is not now nor will it be in the immediate future fully mechanized, particularly in the case of cotton. The Welch-Miley paper states that tractors are being substituted for mule power at a fairly rapid rate throughout practically all of the Cotton Belt. Actually, the only area of the South where significant displacement has taken place has been in the Southwestern States (Texas and Oklahoma). In other parts of the area, tractors have been purchased and are now on farms in about the same density (as related to harvested cropland) as in Texas and Oklahoma; but, in the states east of Texas and Oklahoma, farmers have not, as a rule, disposed of their workstock as rapidly as have farmers in the Southwestern States. As a result, most of the farmers in the Southeastern States that have tractors today probably

have a surplus of both tractor and workstock power. Neither source of power is used efficiently and costs of production in many cases have gone up rather than down.

Doctors Welch and Miley state that 30 to 40 acres of cropland will justify the purchase of a small tractor. It might be well to remember that 65 percent of the farms in the South reported less than 30 acres of harvested cropland per farm in 1945, and 82 percent reported less than 50 acres per farm. It appears, therefore, that about two thirds of the farmers in the area probably cannot economically justify the substitution of tractor power for mule power unless their size of operating unit is changed.

The Welch-Miley paper emphasizes the decrease in labor requirements of cotton on a per-bale basis. In addition, their paper implies that this per-bale reduction has been due largely to mechanization—the shift from mule to tractor power for land preparation, planting, and cultivating. Some progress has been made in this direction; but more important, I think, in reducing per-bale labor requirements, has been the increased per-acre yields of cotton throughout most of the South since 1925–29.

The agricultural pattern of the Southern States as a whole has not and still does not lend itself to maximum use of tractors and their associated equipment. This has been especially true of planting and cultivating equipment. Progress, however, is being made. In Southeastern Alabama, for instance, many farmers who plant four different row crops—cotton, peanuts, corn, and soybeans—are successfully using the same planting and cultivating equipment for all four crops. The problems of changing from one crop to another have been largely eliminated by simply planting all four crops in rows of the same width.

Chopping and hoeing cotton has always been a hand labor process. Current cotton practice studies indicate that this job is now being done in less time than formerly. From 1900 up until about 10 years ago, it normally required about 27 hours per acre for this operation. Today the job is being done, in some areas, in about 17 hours. A number of factors have contributed to this reduction. These include improved methods of planting, better cultivating techniques, etc.

In the case of farms that still utilize all mule power in producing cotton, the reduction in labor requirements for chopping and hoeing have been more than offset by increased labor requirements for harvesting a higher yield per acre. As a result, labor requirements per acre have increased. On a per-bale basis, however, even on these farms, labor requirements have probably been reduced.

Only where tractors are used has any material reduction in labor requirements for producing cotton taken place. And in these instances, the saving has been primarily in land preparation, planting, and cultivating.

Harvesting cotton is still the major bottleneck in the way of materially reducing cotton labor requirements throughout most of the Cotton Belt. More than half of the total labor requirements of producing the crop are normally expended in the harvesting operation (hand-harvesting). The only major section of the Cotton Belt that has made much progress toward reducing harvest labor requirements has been the Southwestern area. In

this area, about half of the cotton crop is normally handstripped or snapped.

Mechanical strippers and machine harvesters are today beyond the experimental stage. They have been adopted and are in use in some areas. The Welch-Miley paper states that during the past eight years mechanical cotton harvesters have been given exhaustive tests, and that today there are four different companies with machines on the market. Even so, the rate of adoption has been slow. This year, probably less than five percent of the Nation's cotton crop will be mechanically harvested, and more than half of this will be outside the Cotton South.

Cotton harvesting machines that are currently available can do the job. They can reduce labor requirements; they can reduce costs of production; they can assist in increasing per capita returns from farming. They can do these things, however, only under certain conditions. The technical feasibility of machine-harvested cotton has been proved; but not so the economic feasibility of machine-harvested cotton for the vast majority of southern cotton producers. Present machines must be adapted to the varying farm conditions characteristic of the Cotton Belt, and produced and sold at a price that farmers can afford to pay.

The use of mechanized farm equipment should continue to expand in the South in the future; however, there will be some resistance to further advances due to the relatively large number of small farms in the area. Mechanical cotton pickers, strippers, and flame cultivators—all indicate tremendous potential possibilities insofar as cotton production is concerned. Such labor-saving devices are being used in some areas, where they are substantially increasing production per farm worker, lowering costs of production, and increasing per capita incomes.

The vast majority of farmers in the Southern States, however, are not utilizing those types of equipment that are currently available, nor will they utilize them in the immediate future. Present size of operating units, limited capital facilities, price-cost relationships, tenure systems, degrees of managerial skill available, and many other factors characteristic of most southern cotton producers are obstacles to full adoption of such equipment in the South.

OVER-ALL ADJUSTMENT IN SOUTHERN AGRICULTURE*

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SIGNIFICANT adjustments have been made in the agriculture of the South in the last 20 years. Changes in the use of land, in crop yields, in livestock numbers, in farm mechanization, and in farm population have resulted in greatly increased farm output, and income both total and per capita. Thus measured in terms of its own history, considerable progress has been made. But compared with farmers in other areas and with desirable standards, farm efficiency and incomes are still low. Therefore, additional adjustments are needed.

Some of the more important changes that have taken place in recent years are outlined briefly and then some of the opportunities for, and problems associated with, future adjustments are presented. The longer term adjustments associated with a peaceful world rather than those of a wartime economy are given major consideration.

Changes in the Use of Land

The greatest and perhaps the most significant change in the use of land during the last 20 years has been the large reduction in the acreage planted to cotton. The average annual acreage planted to cotton in the 13 Southern States decreased from 40.6 million acres during the 1928–32 period to 22.3 million acres during the 1947–49 period.

This tremendous decrease in acreage has been accompanied by large increases in yields. The average annual production in the Southern States was approximately 14 million bales during the 1928–32 period and about 12¼ million bales during the 1947–49 period. In other words, a 46 percent reduction in acreage resulted in a decrease of only 12½ percent in production.

The trends in acreage and production have not been uniform among the different production areas. The average annual production in the Delta areas, in the High Plains, Gulf Coast, and Rio

* This paper does not necessarily represent the official views of the Department of Agriculture.

Grande Valley areas of Texas was considerably higher during the 1947–49 period than during 1928–32, whereas it was considerably less in other southern areas.[1] Large increases occurred in California, New Mexico, and Arizona. In general, acreage has been increased or has been reduced the least in the areas where yields have been increased the most, or where mechanization has progressed farthest.

Important changes have occurred in other crops as well. The acreage of corn in the 13 Southern States was about 6½ million acres or 20 percent less in 1949 than in 1930. The largest percentage decrease occurred in Texas, Oklahoma, and the Delta states. There was a 40 percent increase in the acreage of wheat, with Texas and Oklahoma accounting for most of it.

The acreages of hay and oats were considerably higher in all southern regions in 1949 than in 1930. Sizable increases occurred in the acreages of peanuts, soybeans for beans, rice, and grain sorghum.

The decreases in the acreage of harvested crops more than offset the increases, as the acreage of the 52 major harvested crops was five million acres less in 1949 than in 1937–41, and 7½ million acres less than in 1930. Most of this decrease took place in the Southeast, in the hill areas of the Delta states, and in eastern Texas and Oklahoma.

Changes in Livestock Numbers

The most significant changes in livestock numbers during the last 20 years have been a large decrease in the number of workstock and a large increase in the number of cattle. On January 1, 1950, the number of horses and mules on southern farms was 3⅓ million, or 54 percent less than in 1930 and nearly one third less than in 1937–41. The largest percentage decrease, more than 70 percent, occurred in Texas and Oklahoma and the smallest, 30 percent in the Southeastern States.

The number of cattle, other than cows two years old and older kept for milk, increased about 60 percent between 1930 and 1950 with the highest percentage increases occurring in the Southeastern and Appalachian States. The increase for the U. S. was about 47 percent. Some growth in the number of dairy cows took place in

[1] E. L. Langsford, *Changes in Cotton Production in War and Peace*, USDA, F.M. 45, and unpublished data.

each of the southern regions, but it was much greater in the Appalachian (30 percent) and in the Southeast (18 percent).

Hog numbers were higher in 1950 than in 1930 in all regions, but were lower in 1950 than in 1937-41 in the Delta and Southern Plains areas.

The number of hens and pullets on farms January 1, 1950 was slightly lower in the Delta and Southern Plains states.

The total number of animal units of livestock on southern farms was 12 percent higher in 1949–50 than in 1929–30 and the total number of animal units, exclusive of horses and mules, was nearly 35 percent greater.

Changes in Mechanization

Considerable progress has been made toward mechanization in the South during the last 10 years. There were over three times as many tractors on southern farms in 1950 as in 1940. A much higher percentage of land preparation, planting, and cultivation of all crops is now performed by tractors. A large proportion of the small grains, soybeans, grain sorghum, and rice, is harvested with combines. However, there are few mechanical corn pickers in the South, and only about six percent of the 1949 cotton crop was harvested mechanically. Farmers in the South have made progress in partial mechanization but have a long way to go before the major cash crops will be mechanized.

Changes in Farm Population

The 1949 farm population of 14.4 million people was about 1.5 million or 10.4 percent less than in 1930, when it was essentially the same as the 1937–41 average. This means that most of the decline in farm population has taken place since 1940. The total population in the Southern States in 1949 was nearly 10 percent above the average for the 1937–41 period.

Changes in Farm Output

What effect have these adjustments had on total output? The South has not quite kept pace with the remainder of the U. S. in increasing over-all farm production. In the 1947–48 period total farm output was about 32 percent above 1935–39 in the South Atlantic States and about 24 percent above in the East South Cen-

tral and West South Central regions,[2] whereas the increase for U.S. was about 35 percent.[3] The index of the product added by livestock, exclusive of horses and mules, increased considerably more in the South than in the rest of the U. S. Output per worker in the South was more than 40 percent higher during 1947–48 than 1935–39. The average increase for the U. S. between 1935–39 and 1947–48 was 46 percent.

Additional Adjustment Needed

Before discussing additional adjustments needed in the South, it might be well to outline briefly the situation in regard to general agricultural production. The productive capacity of the United States farm plant is tremendous. Total farm output in 1948, a record year, was 40 percent above 1935–39 and more than 30 percent above 1937–41.

Some people think we are in serious danger of overproduction "across the board." Others think that, under conditions of full employment and a high national income, and with the exportation of a reasonable quantity of agricultural commodities, the entire plant can be efficiently utilized with good returns to farmers. But almost all agree that our production plant is unbalanced. Looking beyond the present disturbed world conditions and assuming a peaceful world instead, an analysis of prospective market demands and a consideration of soil conservation needs indicate that, compared with acreage planted in 1949, some reductions are needed in wheat, corn, and soybeans; and perhaps cotton, peanuts and rice.

What are the alternative uses for the acres taken out of these crops? Would it mean a shifting of some land on each farm to other uses? Would it mean that a considerable part of the land in some of the less productive areas would be abandoned? If most of the land taken out of cash crops were shifted to pasture and hay, which would eventually mean more meat and milk, would there be a market for both at reasonable prices?

These are urgent questions which, with the answers, will have a definite bearing on agricultural adjustments in the South.

Adjustments to Market Outlets

Now turning to the South, acreage allotments for cotton, peanuts, tobacco, rice, and wheat (and in a few areas for corn) are in effect

[2] This represents the census grouping of states and is considerably different from the grouping used in discussing changes in land use, livestock, and tractor numbers.

[3] *Farm Production Practices, Costs and Returns*, USDA Statistical Bul. 88.

in 1950. Acreage allotments for these crops call for a reduction in the South of nearly nine million acres below the acreage planted in 1949. If the production from the 1950 allotted acreage is a fairly good guide to an over-all balance between production and the market outlet for the South's major cash crops, some shift out of these crops is needed. In many areas such a shift is needed in the interest of soil conservation.

The question is what to shift to. In some areas yields of feed grains might be increased enough to make hogs a satisfactory enterprise. In other situations, and particularly on small farms, increases in poultry, eggs, and vegetables to meet local demands of an increasing urban population are worthy of consideration. And in some areas there is land that might best be devoted to forestry. Research findings are not available to prove the point conclusively, but it appears that, in general, the South's best competitive position in a program of full production will be accomplished by a shift toward roughage-consuming animals and pasture. New pasture grasses, new cultural and production methods for both hay and pasture, have been developed. The technical feasibility of developing pasture with very high carrying capacity has been demonstrated by southern Experiment Stations and by a few farmers scattered throughout the South.

Pasture farming usually has been thought of as an extensive enterprise with low return per acre. In some areas it is, and perhaps it should remain so there. But in some others it can become a rather intensive enterprise because, with fairly heavy inputs of fertilizer and lime, the pasture will have a high carrying capacity. This will make pasture a possibility on much smaller farms than have usually been thought suitable for the purpose.

Need for Increased Efficiency

The South's major agricultural problem is to increase per capita farm incomes. Yes, considerable progress has been made during the last 15 years when measured in terms of the South's past. But compared with other segments of the American economy and with desirable standards, per capita farm incomes here are still very low.

Low incomes are associated with low volume of physical production per worker. Gross farm production per worker in the South, in 1944, was considerably less than one half of the national average, and the realized net farm income per worker in the South was also

less than one half as large as the national average.[4] Low volume of production per worker is due largely to the fact that a great deal of hand labor is used in relation to the other factors of production. The value of land, buildings, livestock, and equipment, per farm worker in the South in 1945, was only about 40 percent as high as the national average. In the South Atlantic and East South Central States the value of equipment per farm worker was only one fifth as great as in the West North Central States.[5]

These figures indicate definitely that investment capital per agricultural worker is much less in the South than in other regions. However, the value of land, buildings, livestock, and equipment per acre of cropland in 1944 was about the same in the South as the national average. A slightly smaller percentage of the total investment is represented by equipment, and a slightly higher percentage by land and buildings, in the South than in the remainder of the U. S. Annual expenditures (other than for labor), as for fertilizer, seed, and materials, per acre of cropland are probably larger in the South than the average for the U. S. The gross value of all production expressed in terms of value per acre of cropland is also slightly higher in the South. However, capital, fixed and annual per unit of production perhaps is as high in the South as the average for the U. S.

There are inefficiencies in the use of investment capital in the South. Per acre of cropland, the investment in housing for farm families and in service buildings is high. Farm power and equipment are not used nearly to capacity, particularly on small farms. The solution to the capital problem may lie in changing the type of capital investments and in increased efficiency in the use of capital, as much or more than in an increase in the total volume of capital *per acre of cropland*. This point will be discussed again in a later section.

There are some important possibilities for increasing output per worker and incomes within the framework of the present land-man ratios. The adoption of improved production practices, such as increased use of fertilizer and lime, using better quality of seed, and better cultural practices, has increased phenomenally during recent

[4] *Income Parity for Agriculture*, Part VI, Section I, USDA, Processed report, October, 1945.

[5] Sherman E. Johnson, *Changes in American Farming*, USDA Misc. Pub. No. 707.

years; but the opportunity for further improvement in the South is still great. This is particularly true of pasture and hay crops and livestock.

The potentialities for making better use of low-grade resources also are important. A significant percentage of the land on many farms is not in crops or pasture. Much of this land should be in trees, and much could be done through the adoption of improved woodland practices to increase the returns from this underrated resource.

In some areas increasing the acreage of truck crops of high value offers a possibility of increasing output per worker. There are also possibilities of shifts among enterprises on individual farms. Even shifts of population and crops among areas within the South might be considered. These adjustments could increase not only output per worker but income per worker, if they were in line with adjustments to market outlets. But if these important types of adjustments were made without a decrease in farm population, the per capita farm incomes in the South probably still would be low in comparison with farm incomes in other regions.

Adjustments more far-reaching than those that are feasible within the framework of the present land-man ratios will apparently be needed if per capita farm output and incomes in the South are to become commensurate with those in other regions. Two other possibilities might be examined; (1) increasing the relative prices of the major agricultural products grown in the South and (2) increasing the acres per worker by a reduction in the number of people who are wholly dependent upon agriculture for their incomes.

Generally, product prices will be increased substantially only if there is an increase in demand or a sizable decrease in the volume of production. In the case of most of the South's major cash crops, and cotton in particular, competition is such that higher prices could be obtained only with substantially reduced production. Furthermore, some type of increasingly restrictive limitation of acreage probably would be necessary. This is particularly true if the present land-man ratio prevails. This does not appear to be a very satisfactory solution to the low-income problem from the standpoint of either producers or consumers.

Therefore it appears that the major way of increasing efficiency, measured in terms of income per worker, in addition to adjustments

previously mentioned, is that of having fewer people who are wholly dependent upon agriculture for their incomes.

The magnitude of the population adjustments which may be required is somewhat exaggerated when we consider the total farm population or the number of farms as reported by the census. The Economic Classification of farms used in the Sample Census of Agriculture in 1945 indicates that in 1944 about 30 percent of the farms as defined by the census were part-time or nominal units. Subsequent analysis has given further indication that most of these *were* part-time farms, retirement units, or rural residences. The number of such units probably has increased since 1945. This is not to imply that professional agricultural workers should not give assistance to this group of people living on farms. Nor does it imply that this is not a desirable use of agricultural resources; on the contrary, it should be encouraged. The point is brought up here merely to indicate that the population-adjustment problem might be exaggerated when total and average farm figures are used.

Even making allowance for the part-time and residential units, however, the problem of small farms is great. More than 50 percent of the farms in the South in 1944 were classified as small-scale and small family farms. In 1944 the small family farms in the Southeast averaged 63 acres, with 22 acres of harvested crops. The averages are not very different for the Appalachian and Delta States, but are considerably higher for the Southern Plains States.

Why has this low land-man ratio persisted? What are the opportunities for improving the situation? Perhaps the chief reason for the perpetuation and even the increasing severity of the situation is the relative immobility of southern farm people. What are some of the reasons for immobility? They have been both economic and sociological in the past. They are not developed fully here because any one of them could well be the subject of a more fundamental paper than this one.

The rate of mobility or migration of a labor force is related to (1) the "push-out" of its present occupation and (2) the "pull-toward" other occupations. Apparently, both of these forces have been less active in regard to southern agricultural workers than to agricultural workers in most other regions. Let us consider briefly some of the reasons, and at the same time endeavor to appraise the possibilities of these forces becoming more active in the future.

The "Push-off" the Farm

Perhaps the principal long-run determinant of the degree of "push-off" or displacement of agricultural labor is the development and adoption of production methods which require less labor per unit of product. In general, mechanization has been the chief development that has reduced labor requirements.

The use of mechanical power and associated equipment has not progressed nearly so far in the South, generally, as in other major agricultural regions. This may be partly due to cheap labor; but perhaps a more influential reason is the lack of specialized machines for performing the peak labor operations on the South's major cash crops. Because such machines have not been available, there has been a tendency on the part of management to keep on hand an abundant supply of labor. In other words, there has really been relatively little "push-off" or displacement on the part of landowners.

The number of tractors has increased materially but on many farms—particularly on cotton, peanut, and tobacco farms—they are used because they are a more economical source of power than mules, even though no dollar value is placed on the labor saved. In other words, this is a substitution of one type of power for another. In cotton production, for example, the use of tractor power instead of mule power in land preparation, planting, and cultivation has not resulted in very significant savings in labor except on large farms. If tractors are used for these operations only, and hand labor is used for harvesting and chopping, the effect on the land-man ratio is not significant except as increased proportions of these operations are performed by off-farm workers who are not dependent on wages from this work for their entire incomes.

Then, for mechanization and other technological developments to have a major effect on the land-man ratio, the peak labor operations of the major crops must be mechanized. Therefore, if physical production per worker in the South is to be increased substantially by mechanization, the major cash crops, or at least large proportions of the acreages devoted to them, must be mechanized. Or farmers must turn, at least to some extent, to other enterprises in which complete mechanization is feasible.

The mechanical cotton picker, the stripper, the flame cultivator, the mechanical chopper, the rotary hoe, the use of chemicals in

weed control, the rice combine, the mechanical cane harvester, and other labor saving devices give promise of economically reducing the hand labor needed for cotton, peanuts, rice, and sugar cane. Tobacco is the only major southern cash crop in regard to which large labor savings do not appear to be technically feasible.

The rate of adoption of mechanization and related technological developments will depend not only on the improvement in mechanical efficiency, on the prices of the machines themselves, and on availability of capital or credit, but also upon wage rates which, in turn, will be affected by the ability of farm workers who might be displaced to find means of livelihood elsewhere. On the other hand, the extent or degree of economic advantage of these technological developments and their adaptation to broad areas will affect the magnitude of labor displacement.

Capital investment in terms of imputed values for buildings and equipment (as is the case with census figures) is high per acre of cropland in the South. Capital investment in buildings and equipment, under complete mechanization, on a farm of sufficient size to permit fairly efficient operation, may not be any higher per acre of cropland than the present imputed value. (The remainder of the discussion on mechanization will deal specifically with cotton farms but may have some general application to other farms.) For example, if a farm of 300 acres, without buildings or equipment, were organized as a completely mechanized cotton-cash grain farm (oats and/or soybeans) the investment in buildings, power, and equipment, at today's prices, probably would be less than if that same farm were organized on the basis of cropper and mule operation, assuming the cropper families were housed on the farm. But there is a considerable difference in the type of capital investment. In the latter, a higher percentage of the total investment would be in buildings. If the farm were already equipped with houses for the croppers and with mules and mule equipment, and then the farm were to be completely mechanized (and this is a more realistic situation), much of the investment in buildings, mules, and mule equipment not used would have to be written off, and a large amount of "new" capital would be needed.

A significant point, however, in addition to the need for new capital, is the fact that the service charge for total capital, including the new, would not be raised proportionately to increase in new capital, provided that under the old system the buildings and equipment were being at least partially maintained.

This illustration applies to a large farm. But if six to 10 one-family mule-operated farms were consolidated into one completely mechanized unit, the situation in regard to total capital and the effect on capital service charges probably would not be significantly different.

All areas in the South are not equally well adapted to mechanization in general and to cotton mechanization in particular. Naturally, those areas and farms that are best adapted to mechanization will move first and fastest. They probably will increase their acreage of cotton because mechanization will improve the competitive position of cotton in relation to other crops. The areas that are disadvantaged in cotton production, conversely, will need to reduce their dependence upon cotton. For some farm people the opportunities may be in off-farm employment. For others, the adjustment might be in increasing the size of their farms and shifting to livestock farming. The broad aspects of land use adjustments have been discussed in a previous section.

As the South moves toward the kind of agriculture we have been discussing, additional and different managerial skills will be needed. The ability to operate, repair, adjust, and adapt machinery; skill in handling livestock; and the ability to evaluate the point of economic substitution of one factor of production for another—all will become more important. More of the responsibility of management must be assumed by the operator. Additional emphasis on educational programs, for both youth and adults, is needed to develop the latent ability that is no doubt there.

If these broad adjustments toward increasing the land-man ratio really get under way, some hardships, perhaps even more severe than the present ones, may befall some southern farm people. There are those who are too old, or who for other reasons are not qualified to work in industry or in the trades or services, or to operate larger farms. Some kind of assistance may need to be provided for these people.

If a high level of economic activity can be maintained (and the economic condition in the South will have an important bearing on it), these adjustments, although working hardships in some places, can and will be made over a period of years.

The "Pull Toward" Other Occupations

The attraction for workers to a given opportunity for change in occupation or location is conditioned by the distance involved

in making the shift. Furthermore, potential workers at a considerable distance from a job opportunity are less likely to be aware of the opportunity than are those nearer at hand.

In comparing mobility in the South with that in other areas, it might be pointed out that in some other agricultural regions, much more than in the South, resource-based industries and their attendant complex of service industries sprang up and expanded rapidly just about the time that notable technological developments which decreased labor needs were taking place in neighboring agriculture. Therefore, nearby industrial jobs were available for unneeded farm workers. In other words, the "push-off" the farms and the "pull-to" industry were in operation simultaneously. As industrialization in the South has not progressed so rapidly as in most other areas, people leaving agriculture for industry, except in comparatively limited numbers, have had to move longer distances, and this made for a greater change in environment. As a result, there has been a tendency for southern people to accept a lower level of living rather than leave the farms. Policies that facilitate full employment, and that otherwise provide and promote means for shifting people out of southern agriculture, could have more significant and lasting effects on agriculture than the measures that agriculture itself may take, although they too are very important. Southern people should be much concerned about an expanding economy, about training some of their youth for nonfarm jobs, and about keeping employment off the farms open to southern people. In my opinion, the South could profit more than any other region from sustained full employment and a high national income; on the contrary it would suffer more from a depression.

These inhibiting factors to greater mobility have been spoken of in the past tense. They are still present, but there are some signs on the horizon which point toward some encouraging changes in the future, particularly if this country can maintain full employment. There are great possibilities for industrial expansion in the South. Estimates of the Bureau of Labor Statistics indicate that between 1939 and 1949 the workers engaged in manufacturing in the South increased by three fourths of a million. This is an increase of 42 percent in 10 years. This is small compared with the number that could be displaced if technology advanced rapidly. But when the increases in associated industries, trade, service, and

professional activities are taken into account, it indicates a very encouraging trend. Mechanization, which will tend to stimulate the "push-off," now appears to be in full swing in the South.

Less tangible, but perhaps even more influential than the factors just mentioned, is the fact that southern people have become more aware of their problems and have awakened to the opportunities in the South as well as to possibilities of employment in other regions. The experiences associated with travel gained by the men in the service, and the experiences of those who worked in war industries including good wages, enjoyment of the "city lights," et cetera, have changed the viewpoint of many, and to a large degree this changed viewpoint has influenced their families and their friends. More business leaders are interested in industrial development in their communities, more local capital is available, and capital from other areas is seeking investment in the South. These factors may be expected to enhance the pull toward other occupations for southern agricultural workers, as greater opportunities for work off the farms become available in the South, and as their desires for better living make them more receptive to more distant opportunities.

Better Farm Living

Efficiency is not an end in itself. The ultimate objective is to improve the well-being of the people. Increased output per worker through increased mechanization and other developments will mean better living for farm people. Drudgery will be lessened. Even during the rush periods when farmers work long hours, physical exertion will be less than with hand labor. Much less farm work will be required of women and children. There will be more time for recreation and personal improvement.

All of the returns from increased output per worker may not accrue to the farmers; some of it will accrue to the consumers. Even so, there could be a sizable increase in income per worker which would make for better farm living.

Summary

Significant adjustments have taken place in southern agriculture. Additional adjustments are needed if farm people in the South are to have incomes commensurate with the incomes of farmers in other agricultural regions and with people in other

occupations. Output per worker and efficiency in general must be increased. Mechanization and other technological developments which give promise of increasing output per worker are available, and will be adopted. Fewer people will be needed to man an efficient southern agriculture. Industrialization is increasing rapidly in the South and, if a high level of national activity can be maintained, it will furnish employment for a growing number of farm people. As population adjustments incident to increased efficiency in southern agriculture will create hardships for some people, means should be developed for alleviating them. But if these adjustments can be made, they should result in higher incomes and better living for the people who remain on the farms; and those who leave agriculture will be better off in the long run, than if they had remained in a static or declining agriculture.

This appraisal of the possibilities for adjustments that will produce a more productive and prosperous southern agriculture has been, on the whole, rather optimistic. The fact will not have escaped your attention that the successful achievement of these adjustments depends, in very great measure, upon the maintenance of a high level of economic activity in the country at large. An assumption of economic decadence or stagnation is not a sound hypothesis to apply to the long-run situation. Therefore no apologies are offered for not having given this possibility more consideration. But I am impressed by the wisdom of the following statement by that Missouri farmer-philosopher, Thad Snow: "The bad guesses of the dead economists of the slow-going past ought to warn living economists against over-sureness in these swift changing times."

DISCUSSION

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Implementing a goal of maximum economic progress hits pretty close to home in the South. Will it not be necessary to have the income from resources in agriculture (a primary industry) lower *relative* to other industries to force some of them to move? It is not mandatory that the returns in agriculture (the primary industry) be lowered. The same effect can be accomplished by making the "pull toward" other industries more attractive. Certainly investors of resources in agriculture will want them to stay put if they are given a protected market and a "cost-plus" contract to produce a commodity.

It has been almost two decades since an individual has had the privilege of seeing how cheaply he could produce and sell milk in Virginia. The same is true in most states having a State Milk Board which is designed to "control the industry to protect the interest of producers, processors and distributors and the consuming public."

The shift of cotton acreage to areas with the greatest comparative advantage (referred to by Mr. Langsford) would be a natural consequence to expect if competition existed and no artificial restrictions on mobility of resources were in effect. Too often marketing quotas, acreage allotments, milk bases, etc., are set by political expediency with no real regard for resource efficiency. Consider the case of cotton last winter.

I'm fairly well convinced that with our meager knowledge, we cannot direct the production of all commodities as well as the market place can. We have only to look around to confirm this. I'm reminded in this connection of a passage from Adam Smith's *Wealth of Nations:* "The statesman who should attempt to direct private people in what manner they ought to employ their capital would not only load himself with a most unnecessary attention, but assume an authority which could safely be trusted, not only to no single person, but to no council or senate whatever, and which would nowhere be so dangerous as in the hands of a man who had folly and presumption enough to fancy himself fit to exercise it."

One of the main adjustments in the South is likely to come by adding an enterprise to the existing farm rather than replacing the present system. In most instances this will be some form of livestock. This calls for additional capital to be moved into the area. In turn, aggregate output for the area would be increased if labor remained constant. It might be as well to concern ourselves with the capital-labor substitution rates in producing the total value farm product as the land-man ratio. The simple truth of the matter might be that considering the capital position, uncertainty, economic horizon, etc., facing the farmers, a lot of them are fairly efficient in using resources at their disposal.

Their incomes may not be "commensurate" with those of farmers elsewhere (measured on a per capita basis), but is there any reason why they should? After all, income is a function of capital, labor, and land, and *not* of labor alone.

A high level of national activity is desirable. However, is it to be expected to go hand in hand with a restricted agriculture? Is there any reason to expect other sections of the economy to make a more efficient and fuller use of resources than agriculture? For instance, is there any justification for the agricultural industry to get up in arms about the featherbedding taking place in other industries so long as essentially the same practice exists in its own back yard?

Possibly we need additional tools of analysis to attack the more complicated problems arising from the interplay of the various forces affecting southern agriculture. A more thorough understanding and use of existing analytical tools will go a long way in providing the solution to the more urgent problems.

ADJUSTMENT PROBLEMS IN MIDWEST AGRICULTURE*

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ADJUSTMENT problems in midwest agriculture are less critical than in certain of the other regions but no less complex. A large proportion of the problems that do exist grow out of technological changes in agriculture, the changed values placed upon soil conservation and economic security, and the varying demand for agricultural products. For the purposes of this paper it is assumed that the Midwest includes the Corn Belt or the North Central States except for the range areas largely west of the 100th meridian. The problems of the range areas fall more logically with those of the adjoining states to the west.

This paper has been directed toward a broad survey of the major adjustment problems in the region rather than a detailed analysis of the strictly farm management adjustments. In doing this no attempt has been made to appraise the special techniques or approaches most desirable for bringing about these objectives. The treatment of the fundamental question of the part governmental agencies should play and the types of research needed has been left to others.

In this presentation I have grouped the adjustment problems of the Midwest under four main headings. First, those centering around shifts in use of agricultural resources; second, those growing out of technological changes; third, those resulting from economic and social factors; and fourth, institutional adjustments made necessary by the three forces just mentioned. Certain problems may fall under more than one classification but in the main they can be grouped under these headings.

Shifts in Use of Agricultural Resources

On the fringes of the Corn Belt, particularly in parts of Southern Indiana, Missouri, and Ohio, and in Northern Michigan, Minnesota and Wisconsin, there are areas which are being and should continue to be shifted from individual farms to forestry, wild life and recreational uses. These areas need to be placed under

* Journal Paper 496, Purdue Agricultural Experiment Station.

the management of the public or some institution which can provide greater continuity of management than the individual. They tend to be overpopulated relative to the resources. This makes the proper shifts in land use difficult because it requires either a partial depopulation of the area or the bringing in of additional resources, usually in the form of new industries. We have had much more experience in developing new areas than we have had in withdrawing from settled areas. Most of you are familiar with such situations, therefore I do not need to go into the details of relating the causes of this problem.

Many adjustments in the use of land in individual farms are needed. We are familiar with the practice that took place on the timber soils of clearing the land nearest the buildings and leaving the woods on the back part of the farm. Sometimes this resulted in the remaining timber being located on the best land. On many farms some land now in crops needs to be shifted to pasture and in extreme cases land needs to be shifted to timber. On other farms timber land and permanent pasture need to be brought into the rotation. Generally speaking, the land in the Corn Belt proper gives the greatest return when it is used in the rotation, the next highest return when in pasture and the least return when in forestry. Nevertheless, certain land in the Corn Belt is of such a character that it will give the highest long time return in permanent pasture and forestry.

In 1949 an Indiana survey was made of 539 farms to determine what changes were being made following their participation in the Individual Farm Planning Project. Twenty-nine percent were retiring an average of 22 acres from the rotation while 39 percent were reclaiming 15 acres per farm for the rotation. These farms are scattered all over the state of Indiana and represent some of the changes that need to be made on many other farms in at least the eastern part of the Corn Belt. It is interesting that these farms were in total bringing under cultivation about as many acres as they were retiring.

In the high-hazard weather area in the western part of the region there should be shifts back toward more of a grass-livestock economy. The system of land settlement and the periodic years of good weather and high prices have all contributed to smaller units and more intensive farming than is most desirable in the long run. Of course, if the plans for the Missouri Valley Develop-

ment are carried through there will be small areas in this region where the shifts will be in the opposite direction. But these areas will be relatively small in relation to the total.

The changing demands of the nation for bread grains during war have created, also, a serious adjustment problem in the states in the western part of the area. When the needs for wheat are large, grass lands are put into wheat. This adjustment is made rather quickly and easily. It is a matter of selling the cattle and starting the plows. When the needs for wheat decrease and the adjustment back to grass is necessary, it takes place much more slowly and with more difficulty. It means re-establishing grass and purchasing cattle. Both of these processes require capital at a time when the farmer is usually short. If these adjustments are necessary, efforts should be made to facilitate the changes back to grass. Past public farm programs have not usually facilitated this readjustment.

The greater value placed upon the conservation of our resources presents a whole series of problems as to how the farmer should adjust his land use and cropping program to bring about greater conservation. How far should he go with mechanical practices to prevent wind and water erosion as an alternative to lengthening the rotation or shifting the area into permanent grass? How can the increased roughage best be used as a feed or should the legume just be grown as a soil improvement crop? A digestible nutrient of feed in the form of pasture in the Corn Belt has sold for one fourth to one third as much as a digestible nutrient in corn.[1] Will the greater emphasis and improvement in pasture in the South, where a 10-month pasture season can be obtained, place roughage in the Corn Belt at a further discount as a feed? Adjustments in field layout and mechanical practices to obtain greater conservation are needed on many midwest farms, but on each farm the question is to what point they should be carried. We know that in the Corn Belt proper a farmer can go to considerable expense in order to keep the land in the rotation as an alternative to putting it into permanent pasture. The question is how far should he go? In a nation where natural resources are scarce relative to the population, it is to one point; whereas in a nation where they are plentiful, it is to another. Given the physical facts it becomes an economic and

[1] George W. Collier, "Common Errors in Evaluating Farm Practices." This *Journal*, Volume XXVIII, No. 4, p. 881.

social question, a truth often overlooked by some professional workers in the field of conservation.

In spite of remarkable technological gains made in the production of small grains, legumes, and grasses, and in spite of the extravagant claims made for pasture, corn still remains king in the Corn Belt. Farmers make higher returns from growing corn than any other major crop when yields are held at satisfactory levels. However, in order to maintain or raise the yields to satisfactory levels and to control erosion, it is necessary to have a higher proportion of the land in legumes and grasses on many farms.[2]

Adjustment Problems Growing Out of Technological Changes

Output per agricultural worker in the Midwest has more than doubled since 1910. This has meant that the farmer who has not found ways of doubling his physical output during this period has fallen behind in his relative economic position in agriculture and in society. This tremendous gain in output has been made possible not only by greater efficiency in agriculture, but also by technological gains permitting the transfer of many tasks formerly performed on the farm to specialized hands off the farm. I do not need to recite to you the ever-lengthening list. This increase in efficiency on the farm and the transfer of many jobs to specialized groups off the farm have required numerous adjustments in individual farm organizations.

The development of the farm tractor and its associated machines has been the dominant factor responsible for increasing output and farm adjustments. While tractors have been developed for various size farms, the major problem has been the adjustment of the size of farm to the optimum size tractor. The great gain from tractor power has been the savings in man labor rather than in the cost of power itself. To obtain sufficient acreage to gain the full economies of the optimum size tractor, farms have been combined, and all of the problems associated with such an adjustment have followed.

In the eastern part of the Corn Belt particularly, many size-of-farm adjustments are still needed although they have been rapidly taking place. One other phase of the problem is just how far an individual farmer should go in mechanization on a given size

[2] Bureau of Agricultural Economics, USDA, *Possible Effects of Conservational Land Use on Production in the Corn Belt and Lake States*, December, 1947.

farm. Under what situations should he buy a combine, a corn picker, a hay baler, or chopper, a weed sprayer, a truck and a second tractor? How many of these services should he hire? This presents a continuing series of problems to the farm management researcher.

The new technical developments in crop production, which have made possible roughly a one fourth increase in crop output per acre in this area during the last 15 years, have made many individual farm adjustments necessary. On one hand, these new technical developments have increased the complexity of the business of farming. On the other hand, the transfer of some of these technical functions to service agencies has reduced the necessity for technical knowledge. The transfer of the hatching of the chicks to the commercial hatchery decreases the technical knowledge that would have been required if the operation had been performed on the farm. In total these technical changes have enlarged the number of decisions the farmer must make, thus have increased the problems of business management.

The new varieties of corn and grain crops represent technical advances in agriculture which have been rapidly adopted by the majority of farmers. Their advantages were easily demonstrated. It required less skill to buy hybrid seed corn than for each farmer to raise his own. Likewise, no changes in the farm organization had to be made to include the adoption of new small grain varieties. On the other hand, the more productive legumes have been adopted more slowly because of the special soil treatment which they require and the greater difficulty of clearly demonstrating their advantages. Many individual farmers need to substitute alfalfa mixtures, ladino clover, and sweet clover for the traditional red clover and timothy mixtures in the rotation. In the Indiana Individual Farm Planning Survey previously referred to, this was one of the major changes in the rotation. It is my understanding that the moving to more profitable legumes and grasses is one of the major changes made in the Missouri Balanced Farming Program. On many farms an increased acreage of legumes and grasses is needed along with a shift to the more productive ones. While the increased use of commercial nitrogen on certain soil types has permitted more intensive rotations, a large share of the soils need increased legumes and grasses in order to give better soil tilth, aeration, and penetration of the subsoil. Blanket programs must

be avoided, however, as wide variations in soils, management, and types of farm organization occur in every area. In general, legumes and grass crops in the rotation have been over emphasized as feed crops at the expense of their value as soil builders. We need some way of more adequately measuring the soil improvement value of legumes.

New research in the application of fertilizers and the recognition of the results that may be obtained from fertilizers and lime have resulted in a tremendous increase in their use, particularly in the east North Central States. Here again the greater use of fertilizers with the varied soil requirements has increased the complexity of farming. Even with present knowledge on individual farms there are many adjustments yet to be made in this region. The new chemicals for controlling insects and weeds are but another phase of the technical adjustments in agricultural production, creating new opportunities for the farmer who can take full advantage of them.

New research in animal breeding is transferring the function of supplying the farm with breeding stock to organizations off the farm, manned by specially trained scientific personnel. The hybrid chick in poultry, artificial breeding in dairy cattle, and inbred breeding stock in hogs are examples of this trend and are becoming accepted practices. Where these functions lend themselves to the setting-up of special service organizations, the mass of farmers accept these new practices much more rapidly. We have even reached the stage where a few individuals are attempting to operate "pig hatcheries" to supply farmers with weaning pigs for feeding on the same basis as the hatchery man now supplies chicks to the broiler producer.

New research in feeding is also making the preparation of feeds so technical that it is tending to transfer more and more of this operation to the commercial feed companies. This adjustment has probably reached the most advanced stage in poultry. However, with all classes of livestock the preparation of the supplementary feeds has become such a technical problem that many individual farmers do not feel that they can afford the facilities or the time to keep up with the knowledge necessary to the preparation of proper feed rations. The institutionalizing of these functions does much to increase the rapidity with which they are incorporated into farming.

The adoption of the livestock program which will use greater quantities of roughages is one of the adjustments facing midwest farmers. We have learned how to grow more and better legumes and grasses, but the problem of how best to use them remains. On most farms the adjustment to more roughage-consuming livestock involves more capital and more buildings or remodelling of present buildings. It involves changes in farm layout and major changes in farm operations. In general, it involves a shift away from the feeding programs that have given the greatest returns per hour of man labor. Long-time and current records in the Corn Belt show that not only do farmers make higher returns per hour growing corn, but they also make higher returns per hour feeding livestock that consumes large quantities of corn than from producing other classes of livestock.[3]

The modernization of farm buildings to permit the use of work simplification methods and the new techniques in crop and livestock production present a problem on nearly every midwest farm. The substitution of the tractor for the horse has left many horse barns to be adapted to new uses. The mechanization of operations connected with grain and hay storage involves changes which must take into account not only the storage of the grain and hay, but the whole function of handling the crop from the time it is ready to harvest until it is fed to the livestock. The storage facilities may determine in some cases how and when the crop is harvested and how it is fed to livestock. Storage facilities need to provide for drying, grinding, and moving the feed to livestock with the least labor practical. The power manure loader, the barn cleaner, automatic feeders and waterers, the sanitation and related problems involve many changes in livestock housing. These rapid changes in the requirements of farm structures have created a demand for more flexibility in buildings. This has brought forth the proposals on the part of some people for structures of a more temporary nature. Others suggest that we build them as does industry by standardizing them and making the outside structures or shells permanent, but using temporary construction inside. In the main, industrial buildings are so constructed that they can be used for various types of manufacturing. In agriculture, with our inability to forecast future developments, should we move in this

[3] Detailed Cost Reports published by Illinois and Indiana Experiment Stations.

direction? Farmers are in need of much more research and service in this area.

This whole development in agricultural technology is placing a greater premium upon management in midwest agriculture. Technical tasks are being transferred to specialized service organizations. Volume of business and efficiency become of greater significance. More capital is required by the family farm. Greater knowledge of the technical side of farming and business management is required. Farmers who cannot or are unwilling to make the rapid adjustment to this new technology are finding it difficult to fit into the commercial agriculture of the area. The research and extension worker not only has the problem of servicing the farmer, but also the organizations which service the farmer.

Adjustments in Farming Growing out of Changed Economic and Social Forces

Farmers in the Midwest are placing greater emphasis on economic security. One of the major problems of the area is how to inject the necessary minimum amount of security into the family farm business without interfering with technological progress and efficiency. This drive for security characterizes our whole society and it must be reckoned with in agriculture irrespective of one's individual philosophy.

The farmer's drive for economic security has grown out of three developments: first, the technological developments which have made the family farm more vulnerable to price changes; second, the semi-monopolistic policies and attitudes towards security in the other segments of our society; and third, the experiences of the '30s when nearly one third of the farmers lost title to their farms. Today a much higher percentage of the farmer's gross income goes for cash expenditure than formerly. This makes the farm subject to wide variations in net income with relatively small variations in gross receipts. If one examines in detail the receipt and the expenditure items of a typical midwest farm 30 years ago and today, the validity of this statement is easily demonstrated. Formerly, one did not find large expenditures for fuel for the tractor, fertilizer, supplementary feeds, electricity, machinery repairs, baby chicks, and many other items.

Not only have the farm expenditures become more fixed but likewise many of the living expenditures are less easy to adjust.

Much of the midwest rural area has taken on the same cultural background as the surrounding urban areas. No longer may the young farmer start farming with a bride, a broom, a cook stove, and a bed. Now a modern kitchen and nearly the same living expenditure patterns as found in the city are required. He must not only provide these to obtain the bride, but to keep her on the farm. It is true that with more difficult times some of these expenditures will be lopped off, but they have been rather thoroughly injected into our rural social structure.

The semi-monopolistic tendencies in many of the areas which produce goods for agriculture continue to increase the farmer's price vulnerability. Other segments of society have pushed for and obtained policies which have tended to make the prices of their products even more sticky than those farmers receive. The farmer experienced this situation in the early '30s and he sees himself more vulnerable to price fluctuations today than in the past. Therefore, this change towards security is a by-product of both the industrialization of our economy and a changed attitude towards security. Agricultural output is the most stable of any phase of our economy. The problem, of course, is the unstable economy in which agriculture must operate. Until it is demonstrated that greater stability may be obtained in the economy, however, pressure will exist for programs to protect midwest agriculture.

Improvements in transportation have made it possible for many urban workers to move to rural areas surrounding our midwest cities. This movement has created a number of problems. Our present taxation policies have been established on the basis of the individual working and living within the same tax unit. With a factory in the city and urban workers living in the rural area, an undue proportion of the local tax load has been thrown on the farmer within the local governmental unit. A second question that arises in these fringe areas is whether they should be allowed to develop without any direction. Should zoning and some of the controls now used to direct developments in urban areas be applied in the rural environs of the cities?

The constantly changing farm price relationships present the need for continuing series of minor adjustments on midwest farms. More input-output data are needed which may be used to show the most profitable return with varying price relationships. For example, with varying prices, what are the most profitable

levels of grain feeding for the various classes of livestock? How much should fertilizer applications be increased or reduced with the varied price relationships between fertilizers and grain prices? How should farming practices be varied with changing labor rates?

Institutional Changes Needed as a Result of Adjustments in Farming

Technological developments in agriculture in the North Central States and changing economic and social forces have not only required adjustments in farming but in turn adjustments in the institutions serving rural communities. The combining of farm units into larger size family farms and the lowering birth rate in midwest rural areas have reduced the number of pupils in rural schools and created a need for school consolidation. This need for school adjustment has been further accentuated by the demand for schools with broader curriculums, which require more, not fewer pupils. This adjustment in schools also involves roads and often the changing of community centers with all their social implications. It is a complex problem, but it is an adjustment which must be made in many areas of the Corn Belt.

The country church as well as the school has been affected by the declining rural population. Better roads, changed community patterns, secularization, and urbanization of the rural culture have all brought about many adjustments in the rural church, which many individuals view with alarm.

Many adjustments in the agricultural marketing institutions in the Midwest are needed. This applies clear through the assembling, the processing, and the retailing phases as well as adjustments on the farm to give the consumer the quality of product he wants at the time he wants it. It involves an improvement in the machinery of marketing itself. We need a research and education program that will serve the small private and cooperative marketing organizations in the same manner as the individual farmer is now served by our experiment stations and extension services. The work in marketing should be directed toward individuals responsible for operating marketing businesses rather than so much toward farmers as it has been in the past.

The institution of farm tenure has not escaped the impact of the technological and social changes. Many minor adjustments in leasing arrangements have been made as a result of technological changes, conservation, governmental programs, and other forces.

The establishment of the commercial farm management services, which are available in practically all parts of the Corn Belt, is largely the outgrowth of the technological changes in agriculture. They provide a degree of management which is no longer possible for many absentee landlords to give. This service should be extended to many other landlord tenant set-ups. Consideration is being given to adjustments necessary in the transfer of farm property. Arrangements and procedures need to be established which will transfer the farm as a going concern. Too many farms now pass through a period in the transfer when adjustments and management are at a standstill, resulting in hardship to the operator and to the farm itself.

Many changes are taking place in all the institutions serving agriculture. Research and the dissemination of research information are becoming more and more an integral part of agriculture as it becomes more technical. More problems are of such nature that they require a group approach. Therefore, it appears likely that government at the local, state, and national level will play a greater role. Rural people in this area are demanding the same services that are available to urban dwellers; all year roads, electricity, the telephone, and hospital and medical services. They will not give up these services easily. They have become a part of midwest rural culture.

Summary

In summary, out of the developments enumerated grow two groups of adjustments, those within the farmer's boundary fences and those group problems on the outside. The problems within his boundary fences include: the increase in size of many farms; a readjustment in the use of the land resources on the individual farm; an increase in the proportion of the rotation land in legumes and grasses and in permanent grass; a substitution of the more productive legumes for the less productive ones; an increase in practices to control water and wind erosion; a further increase in the use of lime and fertilizer; a livestock program adjusted to the greater use of roughage; a modernization of buildings and an improvement in farm layouts; and an adjustment to the new machinery and organizations serving agriculture.

In the broader area beyond the farmer's fences we need adjustments in our laws and institutions which will inject realistically

greater economic security into agriculture; provide for the shifting of some land now in farms out of agriculture into forestry, wild life, and recreational uses; allow for the intelligent assimilation of urban workers into rural communities; provide for the consolidation of rural schools, churches, and other institutions servicing agricultural people; and allow change in farm leases and land tenure to meet present-day conditions.

Midwest agriculture is truly in the midst of technological and social revolution. The technological changes taking place are of such a dynamic character that they are not only forcing undreamed of changes in farm organizations but are transforming our whole rural social structure. Social science workers have a real challenge in helping to guide and speed up these adjustments with their research and educational programs. We should marshal our forces so that our research findings will contribute on the firing line. We should not discuss these problems on the side-lines in academic generalities while the technological and social forces move on without us.

DISCUSSION

J. E. WILLS
University of Illinois

As the principal basis for my discussion, I shall refer to some material assembled in Illinois a number of months ago.

In thinking about our farm management research program, P. E. Johnston asked each fieldman in our Farm Bureau Farm Management Service for two things: (1) a list of five questions most frequently asked of him by farmers; and (2) a list of three problems about which he, the fieldman, felt the greatest need for additional information or research. I think the replies are a pretty good indication of what adjustments are of concern to a group of farmers in the heart of the Corn Belt; and they point out some of the problems we need to study. Replies from 12 fieldmen include quite an array of problems. As would be expected, the two lists show a good deal of similarity: in fact three fieldmen did not distinguish between the two requests but submitted only one list.

Both Mr. Bottum and Mr. Langsford refer at some length to adjustments related to the emphasis on legumes and grasses in the cropping system. Of the questions reported by our fieldmen, a larger number were in this general area than in any other. It is of particular interest to note the specific way in which farmers' questions were phrased. Here are some examples:

"Can I afford to have more of my land in legumes?"

"How much pasture and hay land should I have for maximum returns?"
"Does a five-year rotation return as much as a four-year?"
"What is the best way to handle sweet clover? As a catch crop will it maintain the soil?"
"What is the best rotation on productive soils on farms with little livestock? How should legumes be handled in this situation?"
"In a grain area what is the advantage of livestock from the standpoint of improving crop yields, compared to a good rotation without livestock?"
"How much of my net income includes fertility taken from the soil and sold as crops?"

These questions came mainly from cash grain farming areas. In support of a point made by Mr. Bottum, they reflect the fact that emphasis on legumes and grasses has tended to assume their use by livestock, and there is a lack of information concerning their specific value in grain farming systems. It is obvious that these questions, although they are economic, require physical facts that are not readily available.

In their papers both speakers refer to adjustments in size of farm and volume of business. Mr. Langsford in particular emphasizes these as major problems in the South. Farmers and fieldmen in our Farm Bureau Farm Management Service are also concerned with these problems. Note the following farmers' questions:

"What enterprises should I get into to increase volume?"
"How far can I expand volume without losing efficiency?"
"Should my business be expanded by purchase of more land and hiring more labor, or should it be contracted?" (A number of our cooperators have contracted their acreages and/or volume of business in the past few years.)

Note also the following, from fieldmen's replies regarding problems needing study:

"The effects on costs of operation of adding enterprises to the farm business."
"Practical expansion limits of particular enterprises."
"Earnings of farms with varying inputs in crops and livestock."

The emphasis on intensity as well as size is of interest.

Mr. Bottum's point about farmers' desire for security is reflected in two questions, "What do records reveal concerning patterns of organization and management that best weather the storm during depressions?" and "What is the long-time outlook for agriculture, employment, and business?" Other questions and problems reported by the fieldmen are significant but we cannot comment on them now.

Mention should be made of one other line of research: perhaps it does not involve adjustments, but it is of concern to us as farm management workers. At least three of the fieldmen expressed need for more study of the personal characteristics of farmers associated with farming success. Specifically they wanted information on what it takes to be a good farmer.

WORLD TRADE AND AMERICAN AGRICULTURE

HOWARD R. TOLLEY*
Food and Agriculture Organization of the United Nations

WHEN one steps back a few years into history in order to view the current problems of World Trade and American Agriculture in perspective, he immediately perceives that great and significant changes have occurred since the First World War. The patterns of world trade in agricultural products, and other products as well, are vastly different. The volume and direction of U. S. foreign trade in agricultural commodities have changed. The foreign trade policy of the United States has changed from protectionism and isolationism to active participation in international efforts to stimulate international trade. And even the primary interests of the U. S. economists who study international trade and teach its principles and their application have shifted from the consideration of tariffs and their effectiveness to such subjects as the balance of payments, exchange rates, full employment in relation to international trade, multilateral versus unilateral or bilateral action, and the effects of U. S. agricultural policies and programs on its foreign trade in agricultural products.

I

Prior to World War I, the trading nations of the world were on the gold standard, most currencies were freely convertible, and the balance of payments problem was not an important one. The main policy issue in the United States was the tariff on imports. The industrialists generally wanted high tariffs to protect them from the competition of imports, while producers of export commodities generally wanted free-trade or a tariff for revenue only.

During World War I, U. S. agriculture expanded in response to increased demand, both domestic and foreign. Manufacture of war materials for the United States and its allies brought expansion in many other industries. The United States made war loans to its allies to pay for imported food and manufactures. At the beginning of the war the United States was a debtor nation to the extent of nearly four billion dollars, but at the end of the war the United

* Paul Kohn, Economist, Food and Agriculture Organization of the United Nations, assisted in the preparation of this paper.

States was a creditor nation to the extent of nearly four billion (exclusive of the so-called war debts). The implications of this fundamental change were recognized only slowly. The gold standard had been suspended during the war and many countries were not able to resume gold payments at the close of the war. Varying degrees of post-war inflation distorted the relation between the internal price levels of different countries, and there were substantial fluctuations in exchange rates. The United States began to press its wartime allies for the repayment of their war debts, refused to recognize that they could be paid only with imported goods and services, and turned to higher tariffs as protection against foreign competition in the domestic market.

The declining export demand for farm products was one of the causes of the decline in farm prices relative to other prices, which in turn brought the pressure for farm relief. With the establishment of the Federal Farm Board in 1929, government action to increase prices by withholding from the market was inaugurated, but the relation of such action to international trade was not recognized.

This trend of the 20's was eclipsed by the world-wide depression, with its precipitous price decline, mass unemployment, and stagnation of international trade. Most countries abandoned the gold standard, currencies were revalued, and a wide variety of other measures taken, in an effort to stimulate both domestic and international trade, expand employment, and increase prices and incomes.

In the United States some of the mercantilist policies concerning international trade that had been dominant in the 20's were superseded. It came to be recognized that if the U. S. would export it must also import. The Reciprocal Trade Agreement Act of 1934 was designed to bring a progressive decrease in tariffs and other barriers to imports. Agreements with many countries resulted in very significant reductions in U. S. import duties.

But as recovery from the depression progressed, the value of U.S. exports exceeded the value of its imports. Most of the gold stocks of the trading countries came to the United States to redress the import deficit. The Import-Export Bank was established to make loans to exporters or to other countries to enable them to acquire imports from the United States. Other ways of closing the gap were given study and attention, and a general policy of promoting the expansion of the foreign trade of the United States seemed to be developing.

However, some of the phases of agricultural policy which evolved in the same period were not entirely consistent with this principle. One of the primary objectives of agricultural policy was to raise farm prices and farm incomes. Two of the important methods were to be reduction of production of specific commodities and government loans and purchases. It was recognized that reduction of production would result in higher prices only if supplies available in the domestic market were reduced. But it soon became apparent that for a number of commodities the so-called adjustment programs were having little or no effect on the total volume of production. Export subsidies, in various forms, were inaugurated to maintain or increase the volume of export crops moving into international trade, thereby reducing the quantities available in the domestic market or held by the government under loan and purchase programs.

For programs designed to raise the prices of import crops (sugar is the outstanding example) the argument for strict limitation of imports was irresistible, and an import quota for each importing country was fixed by law. Further, provision was made for quotas and fees on the imports of any commodity that threatened to interfere with any program under the various agricultural adjustment acts. Even in the agreements under the reciprocal trade program, tariff quotas were established for several agricultural products.

If an internal program tended to conflict with international trade policies, the issue was usually resolved in favor of the internal program. This generalization applies, of course, to most countries. The result of all the forces which influenced the foreign trade of the United States in the inter-war period was a decrease in both exports and imports. And foreign trade in agricultural products declined more than did total foreign trade.[1]

II

With the outbreak of World War II came a sharp and continuing increase in the demand for U. S. agricultural products, both at

[1] Agricultural Foreign Trade as percent of total:

Years	*Exports*	*Imports*
1922–26	45.9%	54.3%
1927–31	35.9	51.2
1932–36	36.4	50.9
1937–41	20.3	51.0

Source: Statistical Abstract of the United States, 1947, page 632.

home and abroad. The burdensome stocks which had accumulated in the 30's moved into consumption. Agricultural policy changed from restrictionist to expansionist. Great increases in production occurred in many other lines, as the United States became the arsenal of democracy. Lend-lease was inaugurated; repayment of war debts would not plague the United States and its allies as it did after World War I. The peace-time problems of international trade were overshadowed by military considerations. Intergovernmental agencies (e.g., The Combined Food Board, The Combined Shipping Board, and The Combined Munitions Board) allocated supplies to the places and uses where the need was greatest.

The United States emerged from the war as the most powerful of all the United Nations. The cost of the war to the United States, great as it was, was much less in proportion to its national wealth and income than it was to most of the other warring nations. The Food and Agriculture Organization has estimated that the national income of the United States in 1947 was greater than the national income of all the Western European countries combined, and over 40 percent of the sum of the national incomes of all the United Nations. Agricultural production in the United States in 1946 was more than 30 percent greater than in 1934–38,[2] while agricultural production in Europe (ex U. S. S. R., for which data are not available) was 20 percent less.[3]

As soon as victory became discernible the allied governments began to consider how international collaboration could be continued after the war to help preserve peace and solve common problems of reconversion, reconstruction, and rehabilitation.

The Economic and Social Council was established as one of the principal organs of the United Nations through which member governments could collaborate in promoting an expanding economy, full employment, international trade, etc. The International Monetary Fund was established to assist in stabilizing exchange rates; the International Bank, to provide international loans for reconstruction and development; the Food and Agriculture Organization was set up, through which governments could cooperate in increasing the production and consumption of food and other agricultural products and improving the welfare of producers; and the International Emergency Food Council was to continue under

[2] U.S.D.A. *Agricultural Statistics* 1949, Table 648.
[3] As computed by FAO.

the aegis of FAO to allocate the food commodities in short supply. The International Trade Organization was projected, through which governments would cooperate in expanding their trade with each other, removing barriers and discriminations, and establishing a pattern of world trade that would be mutually beneficial to all countries.

But the post-war economic problems of reconversion, reconstruction and rehabilitation proved to be more difficult than was anticipated. With the cessation of hostilities urgent internal problems demanded the attention of national governments everywhere, the desire for international cooperation for the common good seemed to decline, many governments became concerned about maintaining their national sovereignty, and seemed to prefer unilateral or bilateral, rather than multilateral, action in the fields of international trade and finance.

Multilateral action through the United Nations and Specialized Agencies has not as yet been positive enough or broad enough to exert any measurable influence on world trade. Many of the governmental controls over trade and foreign exchange inaugurated during the war have been continued. Some hundreds of bilateral trade agreements (many of them essentially barter agreements) have been negotiated, and state trading has increased.

The United States has played its part along with other nations in delaying or preventing positive multilateral action concerning trade and agriculture. When the charter of the proposed International Trade Organization was finalized at Havana in 1948 for ratification by governments, it contained a number of important provisions ("escape clauses") which had been inserted—some of them at the insistence of the United States delegation—permitting any country which became a member of the organization to continue export subsidies, import quotas, and domestic subsidies to producers, and to enter into restrictive international commodity arrangements under certain conditions. Thus acceptance of the charter need not compel a significant change from the inter-war trade policy of the United States with respect to agriculture. But two years have elapsed; Congress has not ratified the charter. The organization was to come into being when 20 countries had ratified the charter, but it seems unlikely that many other countries will take this action until the United States has done so.

The United States did not support the Proposal for a World

Food Board put forward by the Director-General of the Food and Agriculture Organization in 1946. Two of the principal features of this proposal were an internationally financed buffer-stocks operation, and a scheme for moving excessive stocks into consumption at reduced prices. As one of the reasons for not supporting the proposals, the United States held that they were not consistent with the charter of the proposed International Trade Organization.

The United States was one of the leading participants in the 16-nation Preparatory Commission set up to develop alternative proposals. It subscribed to the report of the Commission, but it has not taken the lead in endeavoring to put into effect any of the recommendations which would have required positive international action.

Further, the United States failed to support the proposal put forward by FAO in 1949 for an International Commodity Clearing House. The functions and operations of the Clearing House would have been much narrower than those of the Proposed Food Board. In brief, it would have been authorized (and provided with funds) to purchase surplus agricultural stocks and negotiate sales of these stocks either in inconvertible currencies at commercial prices or in convertible currencies at special prices. The member governments of FAO, instead of accepting this proposal or some modification of it, simply established another intergovernmental consultative committee to keep the situation under review and make recommendations to future sessions of the Conference.

On the other hand, the United States became a party to the General Agreement on Trade and Tariffs (GATT) in 1947, and the Reciprocal Trade Agreements Act has been extended and liberalized. Under the General Agreement the United States has given and received significant concessions in import duties and other impediments to trade. More than two thirds of the U. S. tariff rates have been reduced.[4] The general level of U. S. import tariffs now is lower than it has been since before World War I. The average rate of duty on dutiable imports in 1949 was probably about 15 percent as compared to more than 50 percent in 1930–33 under the Smoot-Hawley Act.[5]

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[4] U. S. Tariff Commission; *Effect of Trade Agreement Concessions on U. S. Tariff Levels Based on Imports in 1947*, Washington, 1949, Table 10.

[5] See Lawrence Witt, "Our Agricultural and Trade Policies," this *Journal*, May 1950.

Under the General Agreement on Trade and Tariffs, the United States (and every other participating country) carries on a simultaneous series of bilateral negotiations, and the agreement which the United States makes with one country is not necessarily identical with the agreement it makes with another country.

Then too, the United States is a member of the International Wheat Agreement, in which 43 nations are now participating. In effect, this agreement is a multilateral long-term (four-year) bulk-purchase contract under which slightly more than half the international trade in wheat was conducted in the 1949/50 crop year.

The loans and grants made by the United States directly to other countries since the war far exceed all the loans and grants made by international organizations (UNRRA, IBRD, IMF, UNICEF, Palestine Refugees, Palestine Refugee Works Administration, etc.). U. S. Government direct grants and loans totalled between five and six billion dollars in each of the three years, 1947, 1948 and 1949, and were at the rate of over 4.5 billion dollars annually in the first half of 1950.[6] In 1949 and the first half of 1950, 90 percent of the sum was in the form of grants rather than loans. In contrast, all the loans made by the International Bank up to June 30, 1950, totalled only 800 million dollars.[7] From the standpoint of world trade and of American agriculture, the European Recovery Program is by far the most important program of either intergovernmental or international aid ever undertaken.

III

At the close of the war, demand for most agricultural commodities important in international trade was so great in relation to their supply that international allocations were continued voluntarily. But even with the large volume of loans and grants, not only from the United States but from other countries and international agencies as well, export availabilities caught up with effective import demand in 1948 and 1949. Agricultural exporting countries became concerned about pending surpluses, even though per capita food supplies in most countries, excepting the Western Hemisphere and Oceania, were still below the prewar level, and in many countries, far below the level of nutritional adequacy.

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[6] *The Midyear Economic Report of the President*, June 1950, Table B-35.

[7] International Monetary Fund: *International Financial Statistics*, July 1950. (Total actual disbursements were $614.2 million.)

The total volume of world trade in 1949 and the first half of 1950 was apparently a little larger than the period immediately preceding the war, but the pattern was quite different. Computations by the United Nations Statistical Office indicate that the volume of world exports in 1949 was 103 percent of the volume in 1937. The volume rose after the general devaluation of late 1949, and for the first quarter of 1950 was 109 percent of 1937.[8] However, agricultural exports were still considerably less than prewar. According to computations of FAO, the total volume (exclusive of USSR) of exports of food and feed crops, meat, and natural fibers in 1949 was only 86 percent of the 1934–38 average.

Before the war, the United States had become the greatest single exporter, with 13 percent of total world export value in 1937. This increased to 31 percent in 1947, declining to 21 percent in 1949 and to a considerably smaller percentage in the first half of 1950.[9] In 1947 the volume of U. S. exports was 2.75 times the 1936–38 level, and still 2.2 times in 1949. Exports of all agricultural products, except cotton, rose to almost three times the 1936–38 average in 1947–48 and 1948–49, and were still more than twice the prewar volume in 1949–50. Cotton exports declined sharply from 1937 all through the war and were still 20 percent below the 1936–38 volume in 1948–49 and five percent below in 1949–50.[10] The greatest increase was in wheat and wheat flour. In 1949–50 total agricultural exports represented close to 30 percent of the value of all U. S. exports, while in 1936–38 they represented 25 percent.

United States imports increased much less than exports. The volume of imports in 1949 was only 120 percent of 1936–38, increasing to about 140 percent in the first half of 1950. The volume of agricultural imports, on the other hand, remained below the prewar level from 1940–41 on, and reached the 1936–38 level in 1948–49 and 1949–50.

Immediately after the war many countries attempted to relax their controls over imports, exports, and foreign exchange; but the U. S. export surplus was so great that the supply of dollar exchange

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[8] Statistical Office of the United Nations: *Summary of World Trade Statistics*, First Quarter, 1950, Lake Success, July 1950.

[9] Computed from Statistical Office of U.N. op. cit. The 1950 percentage drop is considerably affected by the devaluation of September and October 1949.

[10] U.S.D.A. *Agricultural Statistics*, 1949, and *United States Trade in Agricultural Products*, May 1950, U. S. Department of Agriculture (1949/50 eleven months).

accumulated during the war was soon reduced so much that many countries retained or reimposed controls.

The excess of the value of U. S. exports over the value of imports (goods and services) was more than 11 billion dollars in 1947, was still more than six billion in 1949, and at the annual rate of more than 2.5 billion in the first half of 1950.[6] About one third of U. S. exports in 1949 went to the Euorpean countries[11] but the value of U. S. imports from those countries was only about one fifth of the value of the exports.[12] In 1949, the ECA, the Export-Import Bank, and the Civilian Supply Program financed about 50 percent of U. S. wheat exports, about 75 percent of cotton exports, and 60 percent of tobacco exports.

In the first half of 1950, U. S. exports to Europe declined, imports from Europe increased, and the gap was narrowed considerably.

IV

The dollar shortage, government controls of foreign trade and exchange, state trading and the reluctance of governments to initiate positive multilateral action to stimulate international trade, constitute a group of interrelated factors which have had a marked influence on the volume and pattern of international trade which have emerged since the close of the war.

It might be said that the "dollar shortage" has been primarily a manifestation of the fact that the United States emerged from World War II as the most powerful nation in the world. The United States is the greatest single source of agricultural products needed by the importing countries, and at the same time the greatest single source of industrial products needed for the rehabilitation of the war-torn countries and for increasing their productive capacity. On the other hand, the United States is more nearly self-sufficient than any other country with a commercial, as distinguished from a subsistence, economy. The result has been that the other trading countries have wanted and needed the products of the United States more than the United States has wanted and needed the products of those countries.

Loans and grants have made it possible for these countries to obtain huge quantities of both agricultural and industrial products

[11] *The Midyear Economic Report of the President*, June 1950, Table B-39.

[12] U.N. Department of Economic Affairs, *Economic Survey of Europe in 1949*, Geneva 1950, Table 66.

since the war ended. But the supposition has been that the United States would be unwilling to continue to make large grants indefinitely, and receiving countries have been unable to marshal enough dollars through their trading operations or by any other means to repay large loans, and apparently they have felt that they would not be able to do so in the future. As one of the consequences, countries with balance of payments deficits with the United States have been endeavoring to develop other sources of agricultural products and raw materials, and to find other outlets for their export surpluses. The United Kingdom, Belgium, and France have been fostering and financing the development of their colonies to provide both a source of food and raw materials and a market for their exports. The Western European nations, with aid and encouragement from the ECA, have been endeavoring to increase their agricultural production and to expand their trade with each other.

A greater volume of dollar loans for the development of backward countries could help close the dollar gap between the United States and the industrialized countries. (Before World War II, the United States purchased large quantities of raw materials from these underdeveloped countries, the value of which was greater than the value of their imports from the United States. The underdeveloped countries used part of the surplus dollars thus obtained to purchase industrial products from the agricultural deficit countries of Western Europe. Western Europe in turn bought food and other products from the United States with the dollars.)

A considerable proportion of any dollar loans for development, whether made directly by the United States Government, by the International Bank, or by private investors, would be used for capital goods and equipment. The goods and equipment could be purchased from the industrialized agricultural-deficit countries with dollars, which could then be used to buy agricultural products from the United States.

There is a growing awareness of the very large volume of foreign investment required in underdeveloped areas. The technical assistance program, whereby the advanced countries will share their technical knowledge and skills with the people of backward areas, will have to be accompanied by a continuing large volume of foreign investment to insure even slow progress toward better living standards for these people.

Another obvious remedy is further increase in U. S. imports. But even though import duties into the United States have been reduced very substantially, and the widespread devaluation in 1949 was to have reduced prices (in dollars) of imports into the United States from the devaluing countries by 30 percent to 40 percent and even though the exports from the United States have declined, there seemed slight promise in mid-1950 that the gap would be closed in the foreseeable future.

In many highly industrialized countries, particularly in Western Europe, there has been, even since devaluation, considerable incentive to produce for markets other than the United States. In most of these countries high domestic demand, bilateral agreements with food and raw material producing countries, and the need for a large volume of capital goods for colonial development have together provided a ready market. In contrast, a strong export drive, including the organization of comprehensive sales and service organizations, would be necessary to establish a large and continuing flow of exports to the United States and other dollar countries.

Economists may bemoan government controls over international trade and payments, but they have been almost inevitable in countries with internal programs designed to influence the patterns of production and consumption, stabilize prices, foster full employment, and reduce economic and political uncertainties in general. Under these conditions, even a bilateral trade agreement or purchase contract has given to both countries concerned a certain sense of stability and security, and has afforded some basis for forward planning.

Summarizing, before the Korean incident, it appeared that, unless fundamental changes occurred in world political and economic conditions,

(1) A return of convertible currencies and multilateral trade among the trading nations was not foreseeable.
(2) The United States propensity to export would remain much greater than its propensity to import.
(3) Continuation of large loans and grants to other countries would be needed to maintain demand for U. S. exports at the current level.
(4) The volume of U. S. agricultural products available for export would continue to be much greater than before World War II.
(5) Many importers of U. S. agricultural products would continue their efforts to develop other sources of supply, including increased production in their own countries.

(6) Many phases of U. S. agricultural policy would continue to be inconsistent with a policy of expanding international trade, and
(7) Some further adjustment of U. S. agriculture toward less dependence on export markets was in prospect.

V

Then came the outbreak in Korea, the increased tension between the Soviet Bloc and other nations, and the widespread fear of another general war. The United States and other countries of the North Atlantic Alliance, expecting the present high tension to continue, and desiring to forestall a general war or at least delay it as long as possible, are embarking on a program of greatly increased expenditures for defense and military preparedness. Already, an additional 16 billion dollars has been authorized by the United States for expenditures on its own military establishment and for assisting friendly nations in their armament programs.

The United Kingdom has declared its intention to spend 9.5 billion dollars in the next three years on building up her defense establishments, if the United States provides scarce materials and the necessary dollars for foreign purchases.[13] Several other North Atlantic Treaty nations have authorized large increases in funds for defense and armament. Countries in other parts of the world, particularly in the Middle and Far East, will no doubt continue to spend large sums for military purposes.

The magnitude and the tempo of these programs cannot be foreseen, hence their probable economic effects cannot be measured. But it seems certain that they will be far-reaching. The demand for food and other agricultural materials will rise in these countries and prices will tend to increase. Public measures such as increased taxes, allocation of scarce materials, price controls and consumer rationing, may have to be taken by many governments to curb these tendencies, but both prices and consumption of agricultural products may be expected to rise to some extent in most countries where military expenditures are increased appreciably. The international demand may be expected to increase also. As long as existing stocks and current production in exporting countries are great enough to meet the increased demand (including stockpiling of nonperishables) of the importing countries, international trade in agricultural products will probably increase. East-West trade in

[13] H.M.G. Memorandum on Defence, *The Economist*, London, 12 August 1950.

Europe may decline, bringing an increased demand in Western Europe for agricultural products from the United States to replace those which have been coming from Eastern Europe.

The dollar shortage may become only a secondary factor. The increases in United States loans and grants to other countries for defense and preparedness, together with larger imports (including strategic materials) by the United States, may well provide a larger amount of dollar exchange to deficit countries than was available to them in the first half of 1950.

Thus the forces determining the pattern of world trade (including United States agricultural exports and imports) in the period just ahead probably will be quite different from those which were paramount in the period between the close of World War II and the beginning of the war in Korea. The downward trend in agricultural exports from the United States which characterized that period may be reversed. Already the fear of surpluses of export crops in the immediate future has almost disappeared.

AGRICULTURE AND THE CONDITIONS OF POSTWAR TRADING*

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DURING the last decade agricultural foreign trade has been dominated by a series of programs through which agricultural exports have been shipped all over the world and paid for out of United States Government funds. Agricultural exports from 1941 to 1949 inclusive have been nearly $23 billion with over $13 billion contributed by various aid programs, of which Lend-Lease, Army-Civilian Supply, UNRRA, and ECA have been the most important. Approximately 60 percent of these subsidies to exports have occurred since the end of World War II. The main purposes of these programs were conceived in a broad social, political, and economic framework for the improvement of the welfare of particular groups of nations. Some were means of fighting World War II more effectively; the major part in dollar volume were intended to relieve starvation and safeguard the peace. Other related goals dealt with increasing intra-European trade and efficiency, and in some respects, the economic integration of the United States with other countries of the world. It is my intention to examine the relation of these exports to United States agriculture, the impact of United States policy on the conditions of trade between 1945 and 1950, and their meaning and implication under alternative outcomes of the present international situation.

The dollar volume of agricultural exports between 1945 and 1950 was four to five times the volume of the thirties, but the high year of 1947 was still slightly under the post-World War I peak of $4.1 billion in 1919, in spite of the higher price level prevailing in 1947. The physical volume of trade was higher in the forties than the thirties, as the accessible countries of the world attempted to fill their deficiences out of our food supplies. Full employment, bloated war and reconstruction needs, and inflation all combined to increase the demand for America's agricultural products far beyond our capacity to supply them. The techniques of supply allocation, rationing, etc., need not be dealt with here. The pressure of war and political exigencies at the international level led us to develop

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a series of programs insuring that the economic forces affecting the demand and supply of foreign currencies (primarily the dollar) did not interfere with the procurement of food and vital industrial materials. A wide variety of public and private dollar aid programs was developed to short circuit the usual foreign currency arrangements. These foreign shipments of food, coupled with increased demand at home as employment and incomes increased and then inflated, led to a buoyant agricultural price level and rapidly rising farm incomes. During 1949 and early 1950, it was expected that as ECA and other extraordinary aid programs tapered off, the usual commercial considerations would begin to operate. Some decline in exports occurred and further declines were expected, with implications for lower prices in the domestic markets.

Actual conditions under which trade was carried on became almost completely controlled during World War II. State trading monopolies were established under the press of war; or what can amount to the same thing, comprehensive systems of export and import licenses, and priorities in the use of exchange, were established under strict government control. Some of these were temporarily relaxed in 1946 and 1947, until wartime accumulations of exchange largely disappeared. But for a variety of reasons stemming from war dislocations and destruction and particularly the inflation and unrealistic exchange rates, most countries found it desirable to tighten the restrictions, some almost to the war levels. Actual controls are as complex as in the depression years of the thirties with licenses, state trading monopolies, barter agreements, bilateral clearing arrangements, domestic or export subsidies, etc. The present conflict aside, the prospects for future exports of farm products were not bright. In fact, so many people worried and talked about the impact of trade declines on farm product markets and proposed legislation to counter the drop, that the United States was accused of running the aid programs in order to dispose of embarrassing agricultural surpluses. With the further deterioration of the international political situation, it is becoming apparent that the concern will be over shortages rather than surpluses.

Influence of United States on Trade Policy

Many economists in the past have argued for a reduction in the barriers to trade as a desirable economic policy. Basic to the argument has been one or both of two implicit assumptions, namely:

(1) the world's resources should be used more efficiently, and (2) the welfare of different interest groups in each national economy should be compromised on the basis of maximum economic efficiency, construed in a narrow sense without regard to distributive justice. But the world is made up of national states and the nation is made up of various interest groups. They are not interested so much in the aggregate of goods and services available, but primarily or only in the share of the total coming to a particular nation or group within the nation. World welfare and even national welfare are frequently too distant from the thinking of many individuals and groups to serve as an effective stimulus to compromise. We have not had a real world community or even in many cases a national community, but only a series of communities holding different ideals and ethical norms. In consequence, the reconciliation of conflicting policies remained enormously difficult, particularly among nations. In some respects, the nations of the world resemble a number of firms operating under conditions of monopolistic competition, jockeying for position and each trying to exploit the other, while in other respects they resemble a hodge-podge of irrationally behaving economic units.

The trade policies actually followed by most countries have been means of protecting the welfare of domestic producers at the expense of over all world economic efficiency, and in some cases at least, have actually increased a particular nation's welfare by exploiting monopolistic situations. Great Britain's efforts to maintain the pound sterling at $4.02 was certainly in considerable part an effort to keep the costs of imported food and raw materials from the United States, Canada, and other countries at a lower level than required by actual conditions of comparative advantage. If the traditional corrective measures were to be applied to Europe, attainment of equilibrium would be achieved through large increases in European exports, sharp decreases in imports and drastic declines in the exchange rate. Utilizing Keynesian analysis, it may be argued that actual attainment of equilibrium is impossible or nearly so, but the real point is that politically, such drastic measures are very difficult to make as part of deliberate national policy. The European citizen would not accept such drastic changes in his welfare, at least through overt policy decisions; while in the United States, the increase in imports would have raised similar welfare issues. To really obtain a consideration of the goals of economic

efficiency internationally it is essential that the area of decision making, or the levels at which social, economic, and political choices are made, be lifted above the level of the national state; or that some powerful nation lead the way in widening the area of decision making. Until this is done, exploitation of the foreigner is fair game.

We are now in a position to inquire into the political and economic policy of the United States between 1945 and 1950 and to analyze its relation to agriculture. Have we been attempting to raise the level for determining trade policy above that of national states or have we been striving to gain advantages for our nationals? Any real evaluation of the broad conceptions of policy must conclude that the United States' proposals have gone far in the direction of raising the level of policy decisions. The conception and support of the United Nations, the development of the various specialized agencies, particularly the ITO, FAO, International Monetary Fund and International Bank for Reconstruction and Development, have been attempts to move some aspects of sovereignty above the level of the national state. The ECA and other dollar aid programs, the two trade agreements at Geneva and Annecy, and the Point Four program are all efforts with important implications for increasing the economic efficiency and welfare of the world's people. There have been a number of gaps in the program such as the lack of any real effort at counter-cyclical measures, at rationalizing the flow of international investment, or programs to reduce the price instability of the great world commodities. The International Wheat Agreement is only a partial approach and a compromise between nationalism and internationalism. Not all the traded wheat is affected; there is no assurance that three years from now it would be possible for the importing and exporting countries to agree to new price and quantity figures.

In preparing these various economic programs we have not been swayed solely by broad humanitarian considerations. We believed that these programs would contribute importantly to world peace. But they also would strengthen the competitive position of important sectors of our economy in the world markets. A number of our great agricultural staples—cotton, wheat, tobacco, as well as rice, lard, evaporated milk and certain fruits and vegetables—normally have moved into world markets. Peaceful trade, stable economic conditions, and reduced trade barriers benefit

these agricultural products as well as important export industries. A little over a hundred years ago Great Britain turned her face to free trade, and through urging, negotiating, international loanis occasional shows of force, etc., induced many nations of the world to open their doors to British commerce. The growing industres, of England, their efficiency, and their advancing technology had every opportunity of gain if given a chance to trade. They feared no competitor. While the parallel is far from perfect, much of the same opportunity has been ours in recent years. We failed to grasp it in the twenties and thirties, and somehow time has been insufficient or the difficulties too great in the last five years. Nationalism is a far stronger force today, but for certain parts of the world the grim international situation has helped to stir favorable action.

The United States has come a long way in its thinking on international trade since the 1920's. Instead of passing two bills for tariff increases as in 1921 and 1922 we have twice since 1945 made substantial cuts in tariffs.[1] Although important inconsistencies still exist, in general we have turned our face outward towards the world instead of inward at ourselves, with the whole array of programs listed earlier. While differences of opinion do prevail, there are many agricultural, business, labor, and other groups who have a real conception of the problems facing the United States as a creditor nation and of her obligations as the major economic power in the world today.

Unfortunately, the rest of the world has shifted towards restrictions as we moved away and progress towards our major objectives has been slow and halting. There are three main areas into which the basic reasons may be classified. The first includes items which may be listed under "uncertainties." At no time since 1945 have the people of the world really felt that peace was in their grasp. Many felt that an economic depression might be fairly close at hand, even though it did not appear. Actual food shortages, severe rationing, and lack of industrial goods contributed to further uneasiness. The imbalances in the international accounts, coupled to varying degrees and levels of control, provided little faith in foreign markets as either sales outlets, sources of supplies, or economic stabilizers. Small wonder that nations looked inward at their do-

[1] Analysis of the trade agreements may be seen in *Agriculture, Trade, and Reciprocal Trade Agreements*, Michigan Agricultural Experiment Station, Technical Bulletin 220, June 1950, Michigan State College, East Lansing, Michigan.

mestic resources as the first and major source of national well-being.

The second major reason for the emphasis on self-sufficiency is the sheer inability of the nations of the world, including the United States, to establish monetary and fiscal policies or to establish an international monetary system that would encourage confidence. Great Britain's suppressed inflation and the huge sterling balances, accumulated during the war and held outside Great Britain, are an important, but by no means the only, element in the situation. While these conditions exist no country is willing to, or, in fact, can by itself loosen the reins very far over trade and exchange. Further, the welfare goals of several of the countries have made it very difficult to impose the monetary and fiscal measures which are needed.

The third area relates to reconstruction programs in Europe and economic development programs primarily in Latin America, the Near East, and a number of other somewhat scattered countries. Industrialization is considered almost a cure-all in some of the less developed countries of the world. Economic progress in the United States and to a lesser extent in Europe is leaving them farther and farther behind.[2] Factories are wanted as means of increasing the strength and level of income of the nation. A wider range of agricultural and industrial production is desired so as to eliminate dependence on foreign nations and to have a well-rounded economy. Even if it now costs more than it contributes, eventually it is believed that the pattern of development of the United States will be repeated. Hence, tariffs and trade restrictions are imposed. It does not take a long memory to remember that the argument was used closer to home.

Future Direction of Trade Policy

The determination of the appropriate economic and trade policy for a particular country, and the goals against which the decisions of the various nations are measured are profoundly influenced by the very grim international situation in which we find ourselves. Trade policy after the war was being considered in a vastly different economic and political environment from that of 20 or 40 years ago. The lengthening shadows of World War III change once more the basis for analysis and throw into bold relief the failures in attaining the major purposes of our economic and political policy. It can be argued that the first requisite of our international eco-

[2] The studies of Colin Clark make this very evident.

nomic policy at the present time is the attainment of a maximum strength in number and power of political allies, with a pattern of trade and resource allocation which contributes to the maximum production potential in the areas reasonably secure to us in a military sense. Others would argue that while the die may be cast in an over-all sense, many decisions remain in relation to the nations in a peripheral location. It is not my intention to dwell on and define appropriate political goals, but we must recognize that world economics and world politics are closely interrelated. Decisions as to the direction of our political policy will shift the basis for international economic policy decisions. We must ask what are the appropriate goals and aims of international policy and how can trade policy implement the attainment of these goals.

Three different assumptions as to the nature of international political relations will be made. The first of these assumes conditions comparable to those prior to the outbreak of the Korean conflict. In a sense, it asks what trends were in evidence in early 1950 and what were the characteristics of the developing problems in international trade. This backward look is relevant not for the realism of the assumption as to future international events but as a backdrop against which to compare other assumptions.

Trade Policy under Conditions of Peace

Agricultural support levels were increased through new agricultural legislation and because indices of prices paid caught up with indices of prices received. As agricultural prices declined towards and below support levels, greater conflicts appeared between domestic agricultural programs and our over-all trade policy.[3] Import restrictions and export dumping came into focus as possible outs for the increasing amounts of goods being purchased by the Department of Agriculture. It should be noted that we still had not eliminated many of the provisions of the Smoot-Hawley tariff of 1930, which conflicted with our trade program as much or more than present agricultural programs. However, recent measures to protect the operations of the Commodity Credit Corporation and of other domestic interests were important, not only for the actual restrictions on imports, but even more for the suggestion to other

[3] For details see my article, "Our Agricultural and Trade Policies," this *Journal*, May 1950; or D. Gale Johnson, *Trade and Agriculture—A Study of Inconsistent Policies*, New York: Wiley and Co., 1950.

countries that this was basically the direction in which actual policy would go as economic conditions became strained. It also was used by foreign nations to justify similar guaranteed prices to their agricultural producers. Other countries hesitated to tie their policies and economies to a fickle partner who might go home and lock them out.

The long run implications of interferences to trade were largely ignored in both an economic and political sense. In the short run, the foreign market appeared to qualify as a suitable dumping market because of greater demand elasticity and the ease of administratively separating the market; that is, preventing a dumped product from being resold in the higher priced home market. But in the long run, countervailing duties and other counter measures could be expected. Insufficient attention was given to the possibilities of internal dumping, as in the urban slums or in the hills around us. Given the existence of a high level support program implemented through diversionary techniques, we certainly have domestic consumption potentials which could absorb considerable amounts of agricultural products without jeopardizing our international programs. Furthermore, internal use of such surpluses has much to recommend it, completely aside from the international aspects of dumping. It is also curious that we object to importing Canadian poultry and potatoes, Danish butter, etc., yet for many years, have accepted imports of Mexican silver without much question.

Mr. Tolley has discussed postwar changes in the trading situation. Summarizing, under continued peaceful conditions the mixed postwar trends were both encouraging and discouraging, with developing United States policies and economic pressures likely to play the major role in determining the eventual outcome.

Trade Policy under Conditions of War

We turn now to a second assumption, one that our whole being reacts against but which logic insists must be faced. If World War III is almost upon us, what roles do trade and agriculture play? Some things must be clear. First, such a war is not a soft war. We will need to mobilize every resource. We cannot afford to bungle. Nor can we afford inefficient production operations. The focus of war necessities will put a tremendous premium on sheer economic efficiency such as we have never known before. The under-utilized

labor resources of the South, of Eastern Canada, the sugar resources of the Caribbean, the industrial resources of all the nations under our hegemony and within our spheres of influence must be operated as a single integrated production machine. It can be assumed that fiscal and monetary controls will be more far-reaching under total war than under partial mobilization conditions, but will be short of financing through taxation.

With less dispersion in the goals of economic, social, and political policy established under the press of total war conditions, more specific economic programs can be suggested. Further, there will be a willingness and the necessity to give up private privileges or to take them away through social controls in order to increase productive efficiency. The first point is that a customs union (or less efficiently, government purchase and sale to avoid tariffs) among the nations considered politically or militarily secure will enable the productive processes of the various nations to be integrated more effectively for maximum production. Rising prices and incomes will eliminate most of the frictional losses which might occur under less dynamic conditions. But the fiscal controls must be sufficient so that prices still play a role in allocating factors to production and products to consumption. This would also reduce the man-power needs for sheer administration as compared with an economy where inflation was serious and allocation and production decisions were made largely by central control boards.

Second, economic and political policy would need to be carefully considered for those peripheral areas which would be considered possible battlegrounds, possible allies or lost to the enemy. Needed real strategic resources would be purchased now, at higher prices if necessary. Imports would be brought in and stockpiled so as to safeguard domestic supplies as long as possible. Oil from the Near East, rubber from the Far East, and manganese from almost any area might be among these, and should be purchased almost regardless of the impact on the several economies in the short run. Where conflicts occur, considerations of international political relations must be paramount, provided full cognizance is given to economic, social, and military considerations.

Third, supplies of staple agricultural products begin to look small. Full scale production for stockpile purposes must be encouraged. Further, much of the stocks should be located in friendly countries so as to provide the government and the people with greater cer-

tainty of adequate food supplies. Domestic consumption cannot be given license to gorge at the expense of adequate storage stocks.

Fourth, we should give careful attention to developing a system of controls which provide us with real food stocks as dislocated territories are taken over, so that shortages comparable to 1945–1947 are avoided. It would appear that almost any quantity of food and industrial materials accumulated would still be too little. We should give attention to developing, if possible, a system of fiscal, monetary and trade controls which for once would enable us to come out of a war with less reason for keeping controls than when we went in. Both World War I and World War II provided us with serious inflation, monetary disequilibria and a host of other problems which made rebuilding of a world economy terribly difficult. We did not use the economic stimulus of war demands to free ourselves of many uneconomic restrictions on trade and resource use, but actually built more into the system.

Fifth, under this assumption, time is running out. The 22 years between World War I and World War II is being compressed into five or six years. Technological change is speeding up. We cannot hesitate while others bear the brunt of providing us with time. Can our political, economic, and administrative processes be speeded up at the same rate to cope with the problems thrust upon us? Are our memories of 1940 to 1945 sufficiently long to enable us to avoid the many mistakes of incomplete economic mobilization both for war and the postwar? Peace-time problems and peace-time goals are not appropriate under conditions of a long tough war with the eventual outcome in balance. Their early abandonment increases the possibility of their eventual attainment.

Agricultural and industrial exports will move abroad to friendly countries in accordance with strategic considerations. A new Lend-Lease program will be developed if the need arises. What we export, what we import, and whether we receive monetary, economic, or political returns will be determined entirely by the flow of international events.

Trade Policy under Partial Mobilization

The third and last assumption which will be made about international political events is that the world will vacillate between and short of both full scale war and real peace. This assumes that neither Russia nor the United States will take the final step to

war between themselves, even though military operations may occur in peripheral areas as one or the other of the great monopolists of power strive to extend their areas of hegemony. Implicit to the assumption is the belief that both Russia and the United States will recognize that they cannot hope to conquer the heartland of the opposing power. Political, economic, and military warfare will be carried on with various compromises of clashing interests worked out after shows of force and probing for weaknesses. This is a fairly hopeful and I believe not unrealistic alternative. It involves living in the shadow of war as Europe has lived for many years, and requires that a substantial part of the United States national income be devoted to military expenditures. While other countries may contribute, the United States will carry the major economic burden of preparedness. It is also assumed that much of the transfer of military supplies which may occur will not enter into the balance of payments.

Under these circumstances, it is probable that our price levels will rise gradually as part of the load is financed by inflation. As the dollar is devalued much of the present disequilibrium in foreign exchange rates will disappear. As military procurement takes its bite out of our production machine there will be an incentive to look abroad and particularly to western Europe as a supplier of a wide range of industrial goods. The resulting full employment economy will provide a tremendous market for a wide range of raw materials, semi-finished goods, industrial and luxury products. It is significant that German and Belgian steel is already being sought by American purchasers. As our less efficient production processes have difficulty competing for labor and materials with booming war industries, foreign countries will have greater opportunity to replace these suppliers in our markets.

At the same time, the growing scarcities and higher prices for goods will make it difficult to argue for higher tariffs and trade restrictions on imports. Some foreign countries might be disposed to restrict exports to protect their own consumers. The United States will have an opportunity to shake out many of the inefficiencies now present in our economic system, although we probably would not accept being largely dependent upon another country for an important military commodity if any alternatives are available. Commercial exports will tend to be reduced as our domestic demand expands and the dollar devaluates. They will tend to be

increased as other countries sell more to us and reduce the severity of their controls over imports. The combined result will be less difficulty in selling commodities where our comparative advantage is greater, provided prices reflect real costs of production.

Stockpiles of strategic goods will be accumulated both as a security measure and as a means of politico-economic warfare in the areas where international interests clash. In any case, we will attempt to operate under a policy of large inventories. Food supplies stored both at home and abroad would play a role in preparedness plans, for some countries being as important as military equipment, and would be a necessary part of any program to reduce their agricultural tariffs.

The trade relations between the two spheres of influence will be controlled in many ways, in an attempt to plug up the leaks of any supplies useful for war potential. On the other hand, within the areas or at least within our sphere of influence, trade controls can be relaxed considerably as dollar exchange becomes more available. We shall have an opportunity to develop much more sensible trading relations as United States demands increase and as inflation increases the flexibility of resource allocation. It will become even more politically important to us that serious conflicts over trade policies be eliminated and that other economies be more fully integrated into our own, so that these countries cannot afford to line up with the other side.

One comment on the Point Four proposal is in order. As many of you know, this is not new. As a government program, it has been operating for about 10 years in Latin America under a different name. Many private, semi-public and non-federal agencies have been carrying on operations for years which resemble the Point Four proposals in many particulars. In fact, the inspiration comes at least in part from the success of these less advertised programs. Point Four must be a long time program for economic, social, and cultural evolution, which may at times have potential revolutionary effects. It cannot efficiently be converted into a two or three year stop-communism program except insofar as it can provide some hopes of future improvement for the people concerned. Specific concrete evidence of accomplishments cannot be expected in any short period of time; yet as intermediate objectives are attained, the program can be a powerful tool for reducing the disparities in income, opportunity and well-being which now exist

between the United States and most of the world. It offers an opportunity for other countries to catch up with the tremendous rise in technology and increase in productivity which the United States has had in the last half century.

Concluding Remarks

In the last few decades there have been major variations in prices, employment, and incomes, with an increasing number of people largely dependent for their livelihood on the economic returns from the sale of their services in the market-place. In consequence, there is an increasing concern by individuals and the state in general in providing minimum levels of consumption, and on both the national and international level there is a series of programs directed at modifying the prices at which goods and services can be sold. Fifty years ago our predecessors assumed, with considerable justification, that resources were relatively mobile and that in a growing, expanding economy all "deserving people" were able to move from one job to another, shift their capital around, etc.; and that with few exceptions, the economic returns would be roughly comparable with the moral deserts. Although still concerned with production efficiency, our people have been increasingly concerned with a second major goal centered around concepts of welfare or justice. Is this return to medieval conceptions of economics a sign of a maturing economy or of a decadent one?

The inability of the world's people adequately to cope with these problems has contributed greatly to the instability of the world of 1950. If war is actually upon us, there is one short run goal which is paramount. But to make the eventual attainment of this goal meaningful in the long run it is essential that we give attention to different techniques of attaining welfare objectives as they are formulated in our political economy. Not in agriculture alone, but throughout the economy we must find ways and means of eliminating the many conflicts between objectives of efficiency and objectives of welfare. In our concern for welfare programs we must not forget the goals of national and international efficiency, which alone can provide the goods and services which must be produced if welfare goals are to be attained.

COMING DEVELOPMENTS IN AGRICULTURAL POLICY

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THE development of agricultural policy during the next few years will be strongly influenced by decisions which will be made in the next few months. Attempts to cope with the crisis in international affairs and the drain it imposes upon our resources may result in numerous rigid controls upon prices, consumption, and production. If such controls are imposed, agriculture will not be excepted. Many of the functions of markets will be taken over by a bureaucracy; particularly, the level of farm income will be determined largely by political decisions.

But the impact of the international crisis upon the functioning of our economy need not be of this nature. This nation can decide to obtain the additional resources required by the international crisis by techniques other than direct controls and allocations. It can do this by financing the additional military expenditures by taxation. If this is done, the necessity for direct price and material controls will largely disappear.

The choice of techniques to be used to obtain the resources for military expenditures and to control inflation will significantly affect some of the more important elements in agricultural policy. At this time the choice is still open to us as a nation. No decision will so vitally affect the economic functioning of the economy nor will so strongly influence the development of agricultural policy. For this reason, much of this paper will deal with problems of federal monetary and fiscal policy.

But this does not imply that there will be no degrees of freedom left in agricultural policy, even if the control route is chosen. Those responsible for and interested in agricultural policy must search for means of maximizing agriculture's contribution to the national effort. In the last part of this paper, some of these issues will be discussed.

I

The international crisis has forced these decisions upon the nation. More resources must be devoted to military purposes.

The 1950–51 budget had originally called for about $15 billion for military expenditures. An additional $16 billion has been requested, though probably no more than half will be expended during this fiscal year. In response to this planned increase in expenditure and authorization and expected later increases, individuals and firms have attempted to build up inventories. Prices have risen rather sharply since the beginning of the Korean affair. These developments have created fears of substantial price increases. In the months since the beginning of the Korean affair, most of us have failed to remember that we were already in a price and employment boom of considerable magnitude. The recent events have only added to that boom, particularly since the most important price increases had been in the metal markets.

In this nation, as in all industrial nations, we have a considerable fear of inflation. Inflation reduces the allocative efficiency of the economy by not imposing the normal pressures upon entrepreneurs to achieve operating efficiency. Most of us also recognize the fundamental inequities in the distribution of real income. Regardless of the reasons it seems safe to assume that as a nation we will make the attempt to control inflation by one means or another.

But if we take inflation control as one of the main operating objectives of our national economic policy, we are seriously in danger of missing the most vital issue facing us—achieving maximum economic efficiency. This objective must be considered along with the problem of social justice—the problem of "equitably" sharing the costs of the military effort.

Major emphasis is placed upon efficiency because it seems evident that we are not going back to "normal" in one year, perhaps not in five. Consequently, we cannot afford to take steps now that will reduce our ability to produce more and more year after year; and if necessary to allocate, not 15 percent of our national income to military activities, but 20 to 25 percent over a long period of time. As a nation we have the possibility of devoting as much as 25 percent of our national income to military effort and still have as many or more goods and services to consume by 1955 as we had in 1949. Whether we achieve this will depend in large part on decisions made in the near future.

During World War II we were able to achieve radical increases in output. This was possible, in large part, by obtaining 10 million workers from the ranks of the unemployed, by transferring several

million individuals from low to high productivity jobs (many of them from agriculture), bringing many new people into the labor force, and by a lengthening of the work week. The first of these avenues is now almost closed to us because by the first of June almost everyone who wanted a job had one. The second possibility, though less significant in the aggregate than a decade ago, offers promise. There is still a very considerable volume of underemployment in agriculture. Each of the other routes, all of which involve sacrifices of leisure and household activities, can be used to swell the goods and services passing through the market-place. Plant capacity, on almost every score, is considerably above the level at the close of World War II and heavy investment can continue. We have the resources; the question is whether we can organize them to maximize our economic potential.

II

During the next year, the federal deficit can approximate $5 to $7 billion, if no actions are taken to increase taxes further.[1] Two major alternatives face the nation. I wish to discuss, first, what these alternatives imply to the nation as a whole, and second, what effects these alternatives will have upon the types of possible and desirable farm programs.

The two main alternatives that face the nation can be stated simply. On the one hand, the deficit can be eliminated by increasing taxes (or by reducing non-military expenditures). On the other hand, we can attempt to live with the deficit and eliminate the price rises by direct controls. We can, of course, do some of both, which I am afraid we may attempt. But the general circumstances that would result can be visualized rather easily by considering only the polar actions.

The first of the alternatives—paying for the expenditures by taxes—seems the only reasonable one. By doing this, it is made clear to every citizen that the total supply of goods and services available is reduced by the amount of the additional military expenditure. We do not engage in the self-delusion that because our money incomes have not been reduced that the goods and services that we may buy also have not been reduced, when in fact, they have.

[1] This assumes that about half of the additional requests for military appropriations will be spent. The statement was made before the recent increase in personal and corporate taxes became law.

But more important, this alternative allows the price system to function to allocate the available goods and services. By restricting the monetary demand to a level roughly commensurate with the aggregate supply available for private use, firms are under the normal compulsion to produce as efficiently as possible and consumers are permitted to allocate their incomes as they see fit.

These remarks assume that we are willing to permit consumer choice to function within the range permitted by their incomes. But it may be that we do not, as a nation, wish to permit this for at least two reasons. One is that we do not believe that the distribution of income is as equitable as it should be. But this is not an adequate ground for choosing price control and rationing. If the same general price level can be achieved by monetary and fiscal policy as by price control and rationing, a greater degree of equality can be achieved by tax policy than by price control and rationing. The latter alternative still permits the higher income groups to accumulate assets which can be transferred into consumption goods and services at a later date. By the use of tax policy, the accumulation of these assets would be prevented.

The second is that consumer sovereignty will result in utilizing resources for consumption purposes that have a very high value for military purposes. In the short run, this argument may have considerable validity. Consumers will probably want to spend almost as large a proportion of their incomes upon durable goods as before. And these durable goods compete most directly with military requirements. This is particularly true of automobiles, farm machinery, housing and similar products. If the output of the basic metal products and building materials could be expanded rapidly, no problem would arise. But such does not seem to be the case. Military demands will cut into civilian supplies most sharply in these areas. Price rises might be of considerable magnitude.

This problem must be faced in either alternative. What rationing procedure can be used to allocate five million automobiles or one million dwelling units? The task must be left, I believe, to the price system. And it can be left there.

It may be suggested that the additional revenue can be obtained in two main ways—by increases in corporate and individual income taxes and by commodity taxes on goods utilizing resources in large demand by the military, goods for which consumer demand will exceed available supplies at roughly the present prices. Such

taxes should be set at levels that would equate supply and demand after permitting some increases in basic materials prices to encourage increased output.

For 1950–51 and for any year in which further increases in military expenditures are required, the federal budget should show a surplus rather than merely being balanced. This is required because every dollar of increased federal planned or actual expenditure may require an equivalent increase in private investment over and above what such firms would plan to invest. Thus a surplus in 1950–51 of three to five billion does not seem unreasonable. Such a surplus would be approximated by adopting President Truman's recommendations on corporate and individual income taxes and by the commodity taxes suggested here.

As economists, we usually shun commodity taxes and rightfully so. But in the present circumstances this procedure seems most desirable. I do not believe that any mechanical rationing procedure can be found to allocate these goods; and if price controls, either by government or manufacturers, are imposed, the consumer will be forced to pay as much as he would with the tax, except that the additional payments would redound as a gratuity to dealers or other intermediaries between the manufacturers and consumers. One needs only to look at the experience in the auto and steel markets in 1946, '47, and '48, or at the experiences in the clothing market during World War II to find substantiating evidence.

More than fiscal action may be required to prevent inflation. Price rises induced by scare buying cannot be halted quickly enough by this process. However, it appears that such scare buying has diminished in significance. Our present monetary and credit structure is in an extremely precarious position in the sense that, given present Treasury policy on interest rates, there is no effective control over the money supply. As long as the Federal Reserve System must support the bond market, any bank or individual can transfer bonds into bank reserves or cash, as the case may be. In addition, there are some $33 billion of Series E bonds that can be converted into cash. Further, federal easy credit policies, particularly in the housing field, add to the demand for goods and services in relatively short supply. Higher interest rates should be forthcoming even at the expense of a larger interest item in the federal budget.

Price controls and rationing involve many undesirable features, and each of the presumed advantages can be obtained by other

means. During World War II we embarked upon price controls and rationing because it was believed that people would not be willing to pay higher taxes. In the present situation, we do not need much higher income taxes than in fact did exist in the recent past. But if people do resist paying even higher taxes, it is in part because our citizenry fails to understand that you cannot have your cake and eat it—you cannot devote a large fraction of your resources for military purposes and still have it to consume.

The strongest arguments against price control and rationing are based, in my opinion, on fairly straightforward economic grounds. First, by freezing the price structure of the economy, such controls result in important inefficiencies in resource use. There is little if any disagreement on this point among economists; yet I doubt if the average citizen is very strongly impressed by it. It can perhaps be illustrated by the cotton shirt situation under price control during World War II. Customary price practices called for fairly close margins on work shirts and ordinary dress shirts, much wider absolute and perhaps relative margins on higher priced dress shirts and sports shirts. The results were that manufacturers cut output of the first type of product and expanded the second. Not only were effective prices not controlled, but consumers were forced to buy products of relatively low utility to them. In meats, a similar misallocation of resources prevailed. With price ceilings on meats, it was unnecessary to trim the fat from cuts in order to maximize the packer's or retailer's profits. Consequently, large quantities of scarce fats were wasted that might otherwise have been saved.

Second, it cannot be said that price controls and rationing prevent price rises. At best, such devices only delay what is inevitable as long as the government meets its current obligations by borrowing and money creation. If this were not true, we would live in a world in which the government deficit would have no effect upon the economy and price control would never have anything to do!

The very circumstances that seem to make price control necessary are those that doom it to ultimate failure. Price controls are necessary because the level of expenditure is in excess of the value of available goods at current prices. Price control and rationing limit the amount that can be spent, but do not reduce the amount available for spending. Consequently, money in circulation, demand deposits, and government bonds in the hands of the public increase.

Once spending is permitted, these supplies of liquid assets soon find their way into markets and bid prices up. It is no accident that the quantity of money in circulation plus demand deposits and the gross national product increased in almost identical proportions between 1939 and the present time. And all of the increases in the money supply occurred prior to the end of hostilities.[2]

III

If price controls and rationing are used to achieve price stability, farm prices will be determined in large part by the political process. A general price freeze as of now or June 1 or June 25 or any other recent date would result in a farm output inconsistent with consumer's choices, nutritional objectives, or almost any other allocative criterion that one chooses. Consequently, there would be a long and difficult process of reaching agreement upon the required price adjustments. With relative farm prices at the levels of recent months and all farm products at ceiling prices, it takes no very great insight to visualize shortages of fluid milk in many cities, particularly in the Midwest, and perhaps all over the nation. The same situation might well occur in poultry and eggs. On the other hand, with the price uncertainty removed, beef production would be particularly profitable and hogs would be in an intermediate position.

If the policy of maintaining price stability by monetary and fiscal means is adopted, it is much easier to state what I believe should be done in the field of price and production policies than what would occur. It seems fairly clear that production and marketing controls on corn, wheat, and cotton would be dropped. Tobacco may retain its privileged position for no very good reason. Sugar controls, including import restrictions, should also be dropped, though the pressures against this will be fairly strong. Other controls upon imports of agricultural products also should be removed and presumably most of them would be.

The role of farm price supports would undoubtedly come in for much discussion. There would seem to be little basis for price supports as a means of maintaining or increasing farm income. Farm

[2] I do not wish to deny that, with a program of deficit financing during an inflationary period, price controls and rationing will not have some impact on the price level over the long pull. Such devices do aid in keeping the absolute level of the deficit smaller than it otherwise would be by reducing the cost of goods and services purchased by the government.

incomes would continue to be as high as in 1949, perhaps higher. If price supports are to be used, they should be used to aid in the allocation of farm resources among competing products. This implies that the parity criterion should be abandoned and that the price support policy should be of the forward price type. Given the present favorable capital position of most commercial farmers, the case for forward prices is weaker today than it was a decade ago.

Some may disagree with the position that consumers' choice should be permitted to play the determining role in resource allocation under these circumstances. With the high level of consumption that we can maintain, even if military expenditures increase to 20 to 25 percent of the national income, I am not convinced that any appreciable interference with consumers' choice is required except through the use of the commodity taxes suggested above.

Two such interferences may be considered on their merits. One is to have a positive storage policy for the major storable foods. The object would be to maintain a reserve in case a major war breaks out. Such a policy might consist largely of maintaining feed grain stocks at roughly their present level and gradually to increase wheat stocks. This could be done without creating inflationary pressures of significant magnitude.

A second is to appraise the functioning of our food processing system as it relates to the preservation of the food nutrients actually produced and thus potentially available. Can it be said, for example, that the flour and baking industry is making the most of our wheat supplies? Is there any way of increasing the consumption of dried skim milk or soybean flour? I think most nutritionists would agree that a significant improvement in the national dietary could be achieved by increasing the flour extraction rate, prohibiting the use of shortening extenders, and requiring the addition of dry skim milk or soybean flour to bread.

IV

I would like to turn now to an important problem in agriculture that has been largely neglected in agricultural policy and in research in the social sciences—the problem of low incomes in agriculture. I believe that the coming decade should offer a propitious time for study and action in this field. The basic economic conditions are likely to offer the possibility of achieving solution. It is a sad com-

mentary that we who are interested in agriculture have already let one decade slip by without taking advantage of the possibilities then available.

The low income problem in agriculture has been obscured by the general belief that all of agriculture has been in a sad economic position. This may have been a logical excuse for the farm policies followed in the thirties, but at least since the end of World War II, there seems to be no basis for this belief with respect to the great bulk of active, full time farmers in the North and West. In 1948, the average labor income for all farm workers was roughly $2,100 in the United States, exclusive of the South, and in 1949 probably equalled about $1,700.[3] Employed industrial workers had annual earnings of roughly $2,700. Some adjustment, perhaps as much as 25 percent, needs to be made for differences in cost of living.[4] In addition, the calculations assume that there were roughly 10.09 million people employed full time in agriculture, an overestimate of at least 10 and perhaps 15 percent in my opinion.[5]

In the South, however, labor incomes in agriculture probably did not exceed $900 in 1948 and $750 in 1949.[6] There is no evidence available that indicates that nonfarm labor incomes for comparable labor in communities of the same size differ significantly between the South and the rest of the nation.[7] If a difference does exist, it does not exceed 10 percent for white workers. The relative incomes of Negro workers is not as favorable.

These figures do not imply that all farm families in the South receive low incomes, but they do imply that large numbers of farm workers in the South receive very low incomes indeed. We need more data than we now have before we can say what proportion of the farm workers in the South are now producing (earning) as a result of their labor endeavors as little as $600 a year. I should

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[3] Calculations made by writer from estimates of net farm income by states for 1945 (*Farm Income Situation*, July, 1946) and extrapolated to 1948 and 1949 on the basis of changes in net labor return in U.S. since 1945. Labor return calculated as a residual after deducting from net agricultural income estimate rent to land and a capital return.

[4] See article by Nathan Koffsky and the comments by Margaret G. Reid, E. W. Grove, and D. Gale Johnson in *Studies in Income and Wealth*, Vol. XI (New York: National Bureau of Economic Research, 1949).

[5] Based on an analysis made by the writer of the work experience of the total farm population.

[6] Calculated in same way as estimates for rest of nation.

[7] See Herbert E. Klarman, "A Statistical Study of Income Differences among Communities," in *Studies in Income and Wealth*, Vol. III.

not be surprised if the number approximated two million in 1949, but this is no more than a crude guess.

We cannot be insensitive to the waste of human resources that such circumstances as these imply. There is no evidence that would indicate that these people are inferior to the rest of the farm population as potential productive resources. In other words, if given the same opportunity at a nonfarm job as any random group of farm people, these people could produce roughly as much.[8] By transferring enough of these workers out of agriculture and by raising the labor productivity of those who remained and those who left to $2,000 a year, we could add upwards of three billion to the national income.

Why has poverty in southern agriculture remained to this extent? Why has not a decade of high national income and employment largely solved the problem? I do not think any of us know why. I do believe that the experience of the last decade has been instructive on one point; namely, that the problem will not solve itself even if we have another decade of full employment, which at the moment seems a fairly reasonable assumption.

In this country we have had little experience with guided or assisted mobility and migration. Yet I believe we have had before us for several years a set of proposals which offer considerable promise. I am referring to the conversion program advanced by the then Secretary of Agriculture Claude Wickard, later expanded by workers in the BAE, and recently restated by Secretary Charles Brannan.[9]

The process of achieving higher incomes in an area with a "surplus" of labor involves two main things: first, inducing enough people to find nonfarm jobs to reduce the labor-resource ratio to a level consistent with the desired productivity of labor; and second, to aid the remaining farm people to achieve the appropriate technology, combination of enterprises, and farm sizes.

[8] Based on data relating to the job experiences of farm migrants to nonfarm areas from the various regions of the United States. See D. Gale Johnson, "Comparability of Labor Capacities of Farm and Non-Farm Labor," (Mimeo., 1949).

[9] Claude R. Wickard, testimony in *Cotton, Hearings before the Subcommittee of the Committee on Agriculture*, House of Representatives; 78th Congress, 2nd Session, Dec. 4 to 9, 1944, pp. 94–102; *What Peace Can Mean to American Farmers, Agricultural Policy*, USDA Misc. Pub. No. 589 (Washington, 1945) pp. 12–16 and Charles Brannan, testimony in Low Income Families, Hearings before the Subcommittee on Low Income Families of the Joint Committee on the Economic Report, 81st Congress, 1st Session, pp. 252–60.

If we could achieve the first, the necessary transfer of labor to nonfarm jobs, we could do the second without too much difficulty. I believe that an agency to provide credit and managerial assistance along the lines followed by the Farm Security Administration would be adequate. It would be necessary to concentrate the efforts of such an agency in the places of greatest need, a political task of no small magnitude.

The major political opposition will arise against endeavors to transfer labor to nonfarm activities, particularly when the transfer involves depopulation of an area, more particularly of a county, a congressional district, or a state. The farm labor program during World War II and its meager accomplishments contrasted with anticipations are indicative of what could happen again. A program, such as outlined below, to achieve the transfer of perhaps a million to a million and a half workers from agricultural to nonagricultural work can succeed only as it achieves a solid support from many elements in our population. It must receive the support of the major farm organizations; it must also have the support of the Department of Agriculture. It must have active support throughout the South since the major political opposition at the federal and state level will be in the South.

A program to achieve the necessary transfer of labor might be made up of the following main elements:

1. Establishment of a federal employment service designed to bring to people in low income farm areas knowledge of nonfarm and farm jobs and, where possible, actually aid in obtaining job contracts before an individual has to move.
2. Establishment of a grant and loan fund to be used to help individuals and families to move.
3. Establishment of a land purchase program to purchase land from individuals leaving farm areas, the land to be resold if it can be recombined with additional land to make an economic size farm.
4. Establishment of training programs, preferably arrangements with employers for on-the-job training, with some of the costs being borne by the Federal Government.

In addition, there should be a general improvement in educational opportunities throughout the rural areas of the South. In the short run, this could probably only be achieved by federal aid. Its contribution to achieving and maintaining a higher level of living in Southern farm areas would be extremely important. This again is

something that is fairly generally recognized, but the issue has been complicated by religious and racial issues.

V

In this paper I have discussed two general issues that will be important in the development of agricultural policy. The first was the effect upon agriculture of the general techniques adopted to achieve economic stability. On this score, it has been argued that it would be a serious mistake to attempt to achieve stability by the direct price control and allocation route. This route has no elements of superiority over using fiscal and monetary policy and has several disadvantages.

The second policy issue considered was the low income problem in agriculture. As far as agriculture is concerned, this is the big challenge of the decade. And if we can get the same acceptance for increasing the productivity and earnings of low income farm workers as we can for increasing the price of corn, wheat, or potatoes, the task can be undertaken. And if we can devote the same resources to the tasks that we are willing to devote to development of new lands or to price supports, the objective can be achieved.

DEVELOPMENT OF AGRICULTURAL POLICY

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QUESTIONS concerning the range of phenomena that should be encompassed by policy deliberation are disturbing and important. The policy interests of major farm organizations, as indicated by program statements, far exceed in scope typical policy pronouncements by agricultural economists. A panel of social scientists and other experts is required to evaluate adequately their resolutions. Agricultural policy never has been a monopoly of the economists, but there is reason to believe that *relative* to other social scientists too much of the responsibility has fallen to or been assumed by us. Programs advocated by specialists in any line, however, are likely to lack balance viewed in a comprehensive realistic framework.

The current condition of much of our commercial agriculture is good by certain criteria. It is highly productive, a very great national asset at all times, and especially during periods of great international tension. It is progressive in the sense of achieving increases in output per unit of input over time. On the whole, its physical plant is in good condition. Its aggregate balance sheet has improved tremendously during the decade. It is operating so effectively by these standards that I believe policy-studying resources could advantageously be reallocated somewhat in terms of appropriate efficiency criteria. Marginal principles of efficiency also apply to policy study and program implementation. There remains, however, a plethora of policy problems, many of which fall outside the range of special competence of agricultural economists.

Professional policy study is making much progress in several major directions. On the one hand, we have long since passed the stage when we perforce advocated policies on the basis of broad averages which tended to obscure more than they revealed. We are fitting policy recommendations and scrutiny much closer to the realities of a complex, heterogeneous agriculture. On the other hand, we are making favorable strides toward articulating agricultural policy within broader interdependent economic contexts. Examples of this include integration of professional agricultural policy proposals with fiscal-monetary policy and with trade policy. Professor

Brunner, the Columbia sociologist, has recently said, however, "What we need above all else in the United States, in my judgment, is an agricultural policy for the people of the United States"[1] —suggesting the need for a further extension and integration of agricultural policy frames-of-reference. The idea is not to attenuate the field of agricultural economics by imperialistic extension into all fields, but to discover its optimum policy niche within a balanced framework.

Through theoretical analysis, research, experience, observation and synthetic interpretation of findings from all sources, we have obtained relatively sharp outlines of a number of major economic and social maladjustments of agriculture. We have also gained considerable comprehension of proximate causation of numerous problems, that is, insight into the manner in which they are immediately generated in an evolving society. Problems receiving policy attention include: malallocation of resources judged by efficiency models, instability of income, rural poverty, relative overpricing of land, and many others. In spite of rather major effort, however, solutions to these and other problems are slow in emerging, appearing to encounter formidable common barriers.

For several decades, increased intersector factor mobility has been standard policy prescription for malallocation of resources between agriculture and other sectors. Labor and entrepreneurship, we repeat again and again, should leave agriculture until value productivity parity is achieved. Migration does occur, but at an insufficient rate to equalize relevant marginal value products. Farm product price-income programs fail to alleviate, much less to solve, the problem of rural poverty. These programs continue, however, and many people, including some legislators, appear to believe that poverty in agriculture is solved or solvable by them when, in fact, the current agricultural act, for example, regressively "taxes" consumers for regressive income transfers to people in agriculture. Current efforts to promote better international division of labor are other cases in point. Another case: the near-morbid concern about surpluses while concomitant chronic malnourishment besets a large fraction of our people. All these exigencies are well known, reasonable sounding professional prescriptions for them are avail-

[1] Edmund De S. Brunner, *Education and Methods Conference in Public Policy*, Sponsored by the Farm Foundation, 1950. P. 28.

able; yet we are making slow progress toward solutions. This is not astounding, for these are deep-seated problems.

Professional policy recommendations, particularly farm price policy *vis-à-vis* criteria of economic efficiency, are far in the vanguard of operating programs. Now may be a strategic time to pause sufficiently to seek added perspective concerning the existing agricultural problem and policy imbroglio.

The barrier interposed between problems and solutions is complex, and resistant to rapid penetration by economic means. The barrier consists of social inefficiency—a generic term employed to designate a set of contributing economic and noneconomic phenomena. In this paper the phrase, level of social efficiency, is used to designate the structure of operation of society which determines the levels of welfare (total utility flow) in its inclusive sense, and to designate the "consequent" level of living experienced by people. It should be possible to accelerate progress of agricultural policy by extending, with the cooperation of other social scientists, our analytical frame of reference into a general matrix of social efficiency. This paper is primarily addressed to exploring this possibility with some attention being allotted to means and implications. Included in the motif and closely related to it will be a brief examination of the policy objective, economic efficiency, within this context. Much room for increasing policy effectiveness also exists in this area. Throughout, areas will be suggested in which economists can further contribute towards facilitating policy development. These analytical enterprises are not new, but neither are they exhausted veins.

Casting policy in a framework of social efficiency will illumine areas of resistance to problem solution. It can make other contributions as well. In the absence of problem diagnosis *vis-à-vis* the most comprehensive criteria practicable, we are unable to establish optimum priority for their solution—a very important consideration. There has been far too much public preoccupation with relative red herrings, such as potatoes, in a problem repertoire which includes specimens like literal starvation. Policy execution methods can also be improved via insights obtainable through broader analytical vistas. In places where problem solving lags unduly impediments may be identified, weakened, and in cases removed—nonagricultural employment opportunities may chronically lag due to inertia of household consumption structures in a progressive

economy. Furthermore, certain problems require simultaneous solution although one of them may not be strictly an economic policy problem, e.g., ill health and low productivity. One more case will terminate this selling section in behalf of more comprehensive policy contexts.

There is currently much concern with the content or quality of rural living. As evidence of growing interest, the slogans and/or terms, social parity, welfare parity, parity of access to social amenities, welfare equality for agriculture, etc., are more frequently encountered in our literature. Since we are far from extricating ourselves from the parity-price imbroglio, it is reasonable that we should gingerly examine and cautiously formulate concepts like welfare parity which could draft us into another hectic parity experience. A framework of social efficiency is also symmetrical with the motivation of human conduct.

In general, the policies of all social units, that is individuals, families, and interacting groups of all types including government units, are oriented about and achieve coherence around a more or less inarticulate but dynamic motif of experiencing optimum welfare.[2] The locus of welfare is perforce the individual. By optimum welfare is meant an extension of the concept, content, or level of living, considering all relevant ingredients. Optimum social efficiency exists if all social units are successful in their quest for welfare—within the confines of the relevant culture matrix. Within this all-embracing objective, however, a high value is placed on economic efficiency even though this is ostensibly an attribute of means utilization. Social efficiency in its "mechanism" sense refers more to the quality of living facets of comprehensive resource allocation, all of which have economic content, in contrast with economic efficiency as commonly understood. While referring to economic efficiency, our theoretical models are built in harmony with economic man. In policy consideration, however, we are concerned with activity of institutional man as are social efficiency models. Farmers are willing to sacrifice some production efficiency for greater individual social efficiency. Their compliance with acreage allotments and marketing quotas in return for higher incomes is evidence of this attitude. Much of the drive for adoption

[2] In order to economize on words I have omitted repetition of statements like "I believe," "in my opinion," etc., risking thereby an appearance of dogmatism.

of new techniques in agriculture stems from desire to increase social efficiency by making the work less arduous. The equilibrating forces inherent in the human drive for social efficiency modify the adjustments, anticipated in terms of the assumptions of pure economic rationality. Advocated and adopted policies often appear incongruous to economists because they sometimes actually are, but also due to their conception within a broader "rationality."

Policy should be primarily concerned with the construction of a society operating at optimum socio-economic efficiency for the purpose of optimizing welfare in harmony with contemporaneous capacity. This may involve more or less government participation than now exists, depending upon reigning values. A society is operating in this manner when all its constituent social units are operating at optimum effectiveness within the limits of current culture levels. This is "analogous" with general equilibrium concepts of economic efficiency but more comprehensive. I proceed next to a very general though incomplete examination of components of such a policy.

A step in the formulation of policy directed towards achievement of desired socio-economic efficiency is the construction of appropriate models. Obviously this is not a job for the economist alone, although economists should participate.[3] As economists, we are aware that money wages are not the only income nor money outlay inclusive of all costs. In policy formulation we qualify conclusions made on the basis of marginal value products with some reference to nonpecuniary values. These qualifications, which loom large in real life, can be given greater precision by other scientists. Sociologists as well as economists, including home economists, are frequently concerned with the quantity, selection, and quality of consumer services in agriculture which have economic content. Some of these pose economic problems relatively ignored by agricultural economists. For example, the economics of the medical industry is of great importance to farm consumers, yet it is less frequently the subject of our research than areas of far less moment. Noneconomist professional workers interested in policy are sometimes criticized for being unrealistic, often on a basis of ignoring considerations such as opportunity costs in their recommen-

[3] Cf. M. M. Kelso, "Knowledge for What in the Northern Great Plains; A Symposium," this *Journal*, August 1950.

dations. There tends to be a babel of tongues confusing to many, including legislators. What is needed is a synthetic model built by a competent panel of specialists in related fields—now we occasionally invite a sociologist or a political scientist to participate in policy deliberation. Since the economist is properly concerned with the effectiveness of resource utilization in most mechanisms by which social efficiency can be transmitted, he has an important role in such an enterprise. It is time to concentrate the combined insights of specialists on the problem of increasing social efficiency of rural people consistent with achieving this objective for society as a whole.

Fragmentary socio-economic efficiency model building is in progress in addition to the well-known economic ones. Examples of emerging components include the formulation of standards of nutrition, housing, health, and education. This, however, is far from sufficient. A comprehensive model is needed. This model would be used in the same way and for the same purposes as, for example, models of best resource allocation. A model of this kind is extremely important since policy recommendations are made in a context of problems deduced from models of all kinds rather than *vis-à-vis* the real operating economy or society. Only if models depicting the desired situation and those representing reality are accurate can the best policy be professionally sponsored. In practice, people concerned with policy have mental pictures of how they believe the economy (and society) "should" operate; this picture is compared with their conception of how it does operate and prescriptions made accordingly. It is obviously important that policy actually effectuated should be built in harmony with the best models contemporaneously practicable. Most "models" to date suffer from anachronistic limitation in scope and content.[4]

I will very briefly indicate further what I have in mind. T. W. Schultz has this to say on the subject: "We can also conceive of equality in the sphere of welfare where the test is in terms of social efficiency and where the indicators are to be found in those aspects of welfare in which society has a concern. In this case the comparison turns on education, nutrition, housing, security, and medical services because they are important parts of welfare . . .

[4] Determination of the degree of compatibility between optimum social efficiency and comprehensive progressive economy efficiency presents an interesting challenge.

the test is not over-all equality among families within agriculture, or between families in agriculture and the rest of society, but certain minimum standards . . . ."[5] This is probably a standard most immediately relevant to policy—we need additional ones, however, for both analytical and policy use.

One definition of the personal level of social efficiency is the ratio of achieved quality of living and potentially attainable quality of living. Each individual presents a different problem and no attempt is made to prescribe individual values. Democracy is assumed. We know that values change, however, as experienced social efficiency changes.[6] If the achieved equals the potential, the ratio is one and optimum efficiency is obtained. An acceptable notion of optimum welfare must include the component of progress desired by people.

Potential social efficiency depends upon heredity and contemporaneous culture content including the efficacy of the transmitting socio-economic structure—a "mechanism" so complex that listing of components seems bizarre in contrast. Important elements, however, include items such as housing; nutrition; education in a broad sense; medical, dental, and psychological services; objectives, beliefs, and facts harmonious with current levels of knowledge; recreation, and cultural opportunities. If people are to have opportunity to exploit their potentials, these must be accessible in every sense of that word in their best contemporaneous form—one must remember, of course, the limitation imposed by scarcity of resources.

Actual welfare depends also upon heredity and environment. But achieved social efficiency is dependent upon experienced access to and utilization of welfare transmitting facilities as these actually exist and operate. It depends for the individual upon the quality of accessible goods, the repertoire of which depends in turn on the individual. The more closely the achieved individual content of living approaches his potential the greater his social efficiency—hence welfare. Optimum social efficiency can be attained by all people only in a society operating in harmony with the criteria which define such a manner of operation. Model build-

[5] T. W. Schultz, *Production and Welfare in Agriculture*, Macmillan and Co. 1950. P. 12.

[6] This raises a host of philosophical questions. I repeat, however, that no attempt is made to prescribe individual values except that social efficiency includes opportunity to base these on optimum availability of information.

ers have the task of outlining the attributes which in theory result in this level of welfare for individuals. They have the further task of constructing the best possible synthetic picture of how the social organism currently operates. Initial attempts are likely to be relatively crude. Again this is merely an extension of current activities—most research is aimed at increasing social efficiency in some sense. Let us attempt to accelerate its policy efficacy.

This utopian definition of optimum social efficiency is not designed as a target for immediate action programs. The efficacy of minimum standards appears greater here besides being in harmony with current institutional developments as exemplified by minimum wages. In certain strategic areas of welfare, however, a standard in terms of optima seems more appropriate as well as realistic. Educational standards provide an example. Furthermore we must avoid the possibility of setting our sights too low. The content of the policy recommended minima, for example, should be influenced by progress.

If the people of the United States fail to realize their potentialities for abundant living in the near future, it will not be due to the lack of a highly productive economy. It will be principally due to low levels of social efficiency. Of this, I think, we are all desperately aware.

Establishing criteria for optimum levels of living within the framework of a progressive democracy is no easy task. Since resources are scarce relative to needs in this context, the contemporaneously possible level of living is obviously subject to this restriction. Income distribution vs. incentives is another consideration. Much of the current content of living is subject to quantitative approximation in some sense. The number of years of formal education, work days lost from illness, infant mortality, quantity and quality of food consumed, the number of hours worked per day, number of people in prisons, the size of the military budget, and preventable disability are examples. The more intangible components are very difficult to appraise. These include insecurity of all types, beliefs, values, attitudes, and mental competence in general *vis-à-vis* contemporaneous everyday problems. Their reality, relevance, and increasing importance, however, cannot be questioned.

Estimating current levels of social efficiency in this sense consists of comparing achieved and potential welfare levels. The most

crucial and difficult of these to evaluate is the general mental competence of people relative to the "appropriate standard" for the times. Problems exist regarding the relationship of existing beliefs, attitudes, values, and wisdom in general, compared with what these would be if the social units had optimum access to the available current knowledge with which these attributes of mind could be built. It is in just such intangibles, however, that major socially depressed areas exist. To be unable to rise above comprehension and evaluation of current events and human behavior in predominantly prescientific terms is a profound and widespread tragedy.

Everyone is more or less cognizant of numerous manifestations of currently existing socio-economic inefficiency. Current data on illness, levels of education, crime, levels of nutrition, poverty, housing, recreational practices and facilities, levels of information, quality of social adjustment, etc., are relevant clues. The social scientists are increasingly unearthing pertinent facts and causes, but their findings are slow in achieving application relative to the exigencies of the times. The hiatus I am particularly concerned with here is the partial failure of agricultural policy to utilize more fully the insights of investigators in related fields for more balanced policy implementation.

What about the level of social efficiency of rural people? The consensus is that, on the average, welfare experience (total utility) of rural people falls below that of urban residents, and below minimum standards in major agricultural areas—to say nothing of optima. T. W. Schultz states, "There has been a serious neglect of the welfare of farm people, and it is no wonder that they have fallen behind in education, nutrition, housing, modern medical facilities, free time, old age and disability benefits, and other phases of social security."[7]

A very revealing study by Flagg and Longmore[8] demonstrates the negative correlation between degree of rurality of counties and the level of their consumption of various important goods. "It is clear from the analysis that a classification of population according to rural and urban residence does not provide the necessary details for understanding rural life today. Increasing varia-

[7] T. W. Schultz, *Production and Welfare of Agriculture*, Macmillan, 1950. P. 11.
[8] Grace L. Flagg, and T. Wilson Longmore, *Trends in Rural and Urban Levels of Living*. U. S. Bureau of Agricultural Economics. December 1949.

bility in the conditions under which farm people live imposes a need to study rural life on a scale ranging from the most isolated rural environment to the densely populated metropolis."[9] General equilibrium insights in economics reveal how interdependent economic units and sectors are. Analogous tentative models of social efficiency reveal the intimate inter-relatedness of social welfare. In this area, policy prescription for the farm sector without an intimate concern about intrarural diversity and for rural-urban relations would be more unrealistic than current price programs for the so-called rural economy.

At least three types of concepts and criteria of social efficiency seem to be relevant in a policy context. These can be designated as social-efficiency minima, parity, and optima. The optimum I have discussed above, but a word concerning policy use of minima and parity is in order. Social efficiency minima refer to standards of welfare that society currently feels it cannot let its citizens fall below in terms of its own interests—bounded by current values and socio-economic productivity. This standard could apply to cases where incomes are sub-par either because of malallocation or low productivity, etc. It could also be used to establish the social-efficiency equivalent of stop-loss level prices in times of severe unemployment.

Welfare parity, or social efficiency parity, can be a notion applicable to cases where productivity parity has been substantially achieved—above welfare minimum levels. It is possible that people obtaining identical incomes have divergent opportunities *vis-à-vis* social efficiency. As has been suggested above, this may be true on the average for the agricultural sector. I turn next to some other applications of a synthetic social policy framework.

Many applications of social efficiency models to agricultural policy are possible; time precludes anything but brief illustration. Only three possible applications will be mentioned: (1) better orientation of policies and programs to causes of problems; (2) facilitating the solution of problems by better understanding of barriers to program implementation; and (3) ranking of problems in order of priorities more comprehensively established and more in harmony with an agricultural policy for the people of the United States. These will be briefly illustrated in the order named.

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[9] *Ibid.*, p. 57.

This model would delineate the attributes of optimum structure and operation of society within contemporaneous culture. The best possible counterpart model of actual operation of current society could be analytically compared with it and problems exposed. It would focus the combined outputs of many fields and thus yield invaluable insights into the "organism" (social structure) generating them. It would facilitate causally oriented policy therapy, rather than palliation, leaving structural imperfections intact—such as attempting to cure agricultural poverty by raising product prices. We devote relatively too much attention to the outputs, yields, prices, etc., of our economy, while far too little is paid to the mechanism itself.[10] Society, including the economy, continues to produce simultaneously "upstanding" citizens and criminals, poor people and rich, chronic illness and health, people of low productivity and high, ignorance and enlightenment—all in various degrees. Policy should be directed more towards modifying those tissues of the social organism generating the problem parts. Thus fundamental solution would be facilitated, obviating the necessity for chronic discussion and removal of symptoms. It is not too unfair to say that current economic theory attributes poverty to low income—hardly a diagnosis facilitating policy prescription aimed at alleviating poverty by modifying its causes.

Faster progress in solving farm problems should be possible through operating on barriers to improvement. Acceleration of labor mobility is inhibited by "noneconomic" bottlenecks. Policy recommendations regarding mobility are becoming more and more comprehensive and realistic,[11] but I believe will not be most effective until critical aspects of social efficiency improve. There is no easy solution. The lack of mobility of southern labor resources, for example, will not be solved primarily by operating with immobile resources themselves; rather, their immobility is due to aspects of relatively low levels of social efficiency throughout the country as a whole. It is easy to recommend improvements in education, training, health, nutrition outlook, etc., for these resources, but the trick is to implement these more rapidly through democratic means which waits upon increased social efficiency. In the first

[10] This is not intended as an "anti-quantitative" statement; see Clark L. Hull, "A Primary Social Science Law," *The Scientific Monthly*, Oct. 1950.

[11] Cf. D. Gale Johnson, *Trade and Agriculture*. John Wiley and Sons, Inc., New York, 1950, p. 49 and chap. 7.

place, public measures to improve education and health encounter tremendous inertia as well as resistance on the part of people not adequately informed regarding their importance. Once enacted, their effects are relatively slow.

If labor experiencing sub-parity incomes (relative to accepted welfare minima) because of inferior education, poor health, ethnic wage discrimination, and other manifestations of social inefficiency is transferred to urban employment, it will remain underemployed by economic efficiency criteria. Brunner's suggestion that " . . . the psychologists, the anthropologists and the sociologists are needed to explain the dilemma caused by such attitudes and help in educational programs needed to gain acceptance for a given economic policy . . . "[12] is relevant in this context. While efforts to improve economic efficiency along lines now promoted should continue, incentive to remedy losses from underemployment of labor can be sharpened by combined economic and social insights and education.

Another well-known situation of policy relevance which is replete with implications regarding the importance of accelerating social efficiency of rural areas will be merely sketched. Its importance and implications in the context of current domestic and world problems and forces are obvious. It is well known that agriculture has disproportionate political representation in relation to population distribution. Furthermore, agricultural power tends to be augmented by nostalgic farm-bred folk now in urban environments. Next, focus your attention on the quality of educational facilities available to the farm sector, compared with urban facilities and relative to optimum standards. Levels of formal education achieved are also far below urban levels for both farmers and for rural immigrants to urban areas. Social, political, and economic enlightenment, of course, are not perfectly correlated with formal schooling. Rural people also have less free time and have fewer post-school linkages with the world of ideas. We have, then, disproportionate political power in a large sector relatively disadvantaged in education. In addition, disproportionate population growth takes place in areas of relatively low social efficiency. Thus a chronic impediment to progress may be sustained through our failure to focus policy more in the direction of social efficiency. Agricultural fundamentalists should make certain they are sufficiently fundamental.

[12] Brunner, *op. cit.*, p. 27.

International tensions are important barriers to more economically rational trade policies. These tensions are not likely to be most effectively treated through economic vistas. Obviously, meshing agriculture and trade policies can be viewed in this same context. Another case will have to suffice. Much legitimate concern has been expressed regarding the tendency for gains in agricultural income to be capitalized into higher land values with the implications this involves. I believe that increases in rural social efficiency will tend to shift farmers' choice functions[13] toward parity in leisure, in education for rural youth, and other now subparity components of living, and away from competitive acquisition of land. Furthermore, there is evidence that a trend in this direction is emerging. This consideration of social efficiency and policy implementation is grossly incomplete, but an illustration of relationships between a framework of social efficiency and ranking of socio-economic problems remains.

I believe that lack of more inclusive frames of reference has led to serious over emphasis of some relatively unimportant problems. Obviously, an abundant food production is not a problem we wish to eliminate, but a blessing long sought by a majority of peoples and reached only by a very few who are the envy of the world. Resource maluse is involved in improper levels and structures of output from the agricultural sector. Is this the major economic problem, however, even in an economy at full employment? I think not. Fitted into perspective it might fall far down a list ranked with reference to comprehensive problem evaluation. This list would include problems like loss of economic productivity and social efficiency through low levels of education, nutrition, and health. Pecuniary crime cost may approximate our net farm income. It would include resource maluse from a consumer sovereignty oriented by structures of demand reflecting sub-par social efficiency. It would consider the efficacy of our institutions for allocating resources to political leadership and many other problems. Policy studying and implementing resources are also scarce; they should be allocated according to efficiency criteria. This is not saying that agricultural economists should enter these fields, but that we share the responsibility for rational, balanced, policy formulation. We have received more financial support than, say, rural sociolo-

[13] I am advocating those shifts which are indicated by criteria of economic and social efficiency.

gists, and therefore may have in relation to general welfare tended to overpublicize economic problems.[14]

There is a tendency for people and legislators to be concerned with the problems that are discussed by experts. For this reason, students of policy have a serious responsibility to rank problems in the best possible perspective and *vis-à-vis* the most efficacious criteria. If we had commensurately publicized rural poverty in the repertoire of farm problems, more progress might have been made with our entire farm program.

Numerous other contributions to policy are conceivable from this approach. The utility of specialists acting in advisory capacities to legislators might be improved thereby. Presenting testimony embodying the integrated interpretation of problems by students of related social sciences would be an improvement over the typical practice of offering keyhole views from specialists and leaving the synthetic interpretation to the recipients of the testimony. Reallocation of resources to increase the social product needs to be advocated on a more comprehensive accounting basis. The relatively low wages of rural teachers need not indicate that reallocation towards the urban sector would be in harmony with general welfare. More accurate bases for advocating reallocation would result if marginal social efficiency were algebraically added to the analytically used marginal value products. A theory of mobility in terms of comparative social efficiencies of locales and occupations is possible. Social efficiency orientation tends to focus on people the real concern of policy.

We need an orienting framework within which to focus the policy utility of the combined insights of all social scientists, one which will concomitantly optimize the contributions of each. Social efficiency can serve in this capacity. I do not anticipate rapid formal progress in this direction partly because of the complexity of the task *vis-à-vis* current scientific attainments, but also because of social inefficiency within the academic-professional sector as well, the greatest of which are probably administrative indivisibilities, shortage of personnel, and capital rationing.

The aspect of policy to which this last section applies concerns the manner in which we may play our optimum role in the inclusive

[14] Cf. *Human Relations in Agriculture and Farm Life (the Status of Rural Sociology in the Land-Grant Colleges)*. Report of a study made by a committee of Land-Grant College Personnel. Sponsored by Farm Foundation, 1950.

project of achieving social efficiency. The observations if relevant in that context will also apply to our contributions in the present predominantly unilateral policy orientation.

The thesis of this section is that neither the whole nor any fraction of society can operate at optimum efficiency if any segment performs below its capacity. This implies that the policies of and for any sector should harmonize within the total economy matrix. If sector policy does not mesh effectively, it will impair to that extent the effectiveness of the operation of the whole including the aberrant part.

The over-all, immediate, and long-run objective of agricultural policy is the improvement of social efficiency relative to appropriate criteria. The chief concern of economic agricultural policy as such, however, is the efficiency with which resources producing the economic component of social efficiency are utilized. Parity in production is desired for every industry—consistent with the optimum structure of that industry in a comprehensive welfare context. This is achieved when resources are allocated in an optimum fashion. This situation exists when marginal value products of comparable factors are equal—according to the commonly used static model.

To prescribe efficacious policy regarding economic efficiency in a framework of social efficiency, we need a workable blueprint of optimum resource utilization in an evolving economy. Current theory does not provide tools commensurate with these tasks. It is not necessary to dwell on the limitations of static models *vis-à-vis* progressive to say nothing of dynamic economics. General equilibrium models can, however, provide much analytical insight into optimum growth economics if one operates with discounted marginal value products[15] and appropriate hypotheses (assumptions).

The lack of more comprehensive models defining optimum economic operation seriously handicaps policy formulation with respect to productive efficiency. Some of the more serious gaps in existing models include lack of sufficiently powerful criteria versus the following evolving economy attributes: optimum structure and scope of government participation; optimum rate and structure of economic growth (since this involves operating with discounted

[15] Cf. C. R. Daugherty and M. R. Daugherty. *Principles of Political Economy*, Houghton Mifflin and Co., 1950, chapters 22 and 23.

marginals, this is particularly difficult to construct when cognizant of the need for built-in amenability for identification of empirical counterparts); for obtaining comprehensiveness, since the research job of ascertaining relevant variables for all industries is tremendous; and finally, synthesis within a social efficiency matrix.

Not only do we lack a comprehensive analytical model, but for policy purposes our research-derived empirical "model" of the economy in operation is incomplete. We do not know in an adequately comprehensive sense for detailed policy recommendations how the economy actually operates, e.g., how effectively resources are actually currently employed. Consequently we cannot compare the relevant real-economy marginals. The atomistic nature of research produces fragments of the total-economy mosaic disjointed temporally and uncoordinated structurally. Without adequate models for resource efficiency evaluation, it is difficult to identify and array resource problems with sensitivity and to specify in what areas reallocation should occur. Major aggregate resource problems are currently visible, of course.

Agricultural economics has been primarily a tool-using discipline. For the purposes of formulating economic policy, is the most effective allocation of professional resources achieved? More analytical model building may yield higher returns. Empirical research is fragmented and uncoordinated, to an extent which currently precludes synthesis of the empirical model needed for comparison with optima in resource problem diagnosis—even were a more complete theoretical model available. These are not unrelated phenomena. Again the question of efficient use of professional talent in policy formulation arises. Important work is in progress in many of these areas. My question is one of relative emphasis. The need for pure research, however, is probably difficult to overstate.[16] This applies to both inter-science construction emphasized earlier in the paper and to the "field" of agricultural economics.

The major corpus of existing theory has been primarily focused by agricultural economists on two aspects of policy prescription for production efficiency in agriculture. (In a sense an overwhelming proportion of economic research is oriented towards economy in production and/or welfare.) Standard policy prescription has

[16] Cf. Clark L. Hull, "A Primary Social Science Law," *The Scientific Monthly*, October 1950.

emphasized the importance of stable and full total-economy operation for an efficient agriculture—on the one hand to provide employment opportunities for excess farm labor, and on the other to stabilize aggregate demand for agricultural products. Employment theory and related fiscal-monetary policy recommendations are well advanced relative to this problem.

A second major use of generally accessible current theory has been addressed to the problem of obtaining better (vs. optima) use of farm resources in an effort to improve the structure and level of aggregate agricultural output. Professional policy applications have been along two major lines: (1) towards improving the efficiency of farm-product marketing, and (2) utilization of resources by farm firms in harmony with efficiency criteria. Major research resources are concentrating in these areas. Policy and program recommendations in the area of product prices and effective production *vis-à-vis* efficiency criteria are far in the vanguard of adopted programs.[17] Since this appears true, the question arises—is it possible to gain marginally by shifting policy resources into areas which appear less well integrated with the major corpus of price policy?

While much attention has been paid to the relationship of on-farm price structures and levels on effective agricultural resource use in the interest of farm and general welfare, much less has been accomplished for the factor markets. The structures of operation and marketing of the farm machinery and supplies industries relative to impact on agricultural efficiency seem especially obscure. This is a critical gap in policy resources because of its close association with progress. Important improvements of agricultural price policy in harmony with general welfare can follow increased effort towards incorporation of the factor sector into the major structure of farm price policy. The appropriate on-farm price structure cannot obtain in the absence of an efficient factor sector.

Similar generalizations apply to rural consumer good markets and farm policy.

Increasing farm income by raising product prices and lowering some factor prices (credit, labor) fails to "equalize" opportunities for achieving parity of social efficiency for rural people consistent with this objective throughout society. The comprehensive ef-

[17] Cf. the published works of J. D. Black, Jesness, D. Gale Johnson, Nicholls, Shepherd, Schultz, Wellman, Wilcox, *et al.*

ficiency of the sector[18] constituting the major transmitting mechanism for social-efficiency-accessibility for farm people is also involved —including its public aspects.[19]

DISCUSSION

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These two papers have the same title, but they cover very different subjects. Dr. Johnson analyzes the current economic situation and makes specific policy recommendations to deal with immediate problems. Professor Brekke outlines in some detail the research that must be carried out if the economist is to help develop a long-term agricultural policy that will benefit the whole public. Each paper is excellent in its own way. Perhaps we should have had still a third paper under the same title, "The Development of Agricultural Policy." This third paper might well tell us what developments are now under way, and what procedures are actually being used to develop agricultural policy.

Dr. Johnson has presented a remarkably clear and able discussion of some of the principal current economic issues affecting agriculture. He has told us exactly where he stands on these issues, and what he thinks should be done. I would like to compliment him for this, and I hope more economists will follow his example.

In general, I agree with Dr. Johnson's analysis and with his recommendations, Inflation is our most threatening immediate economic problem. Direct controls will be difficult, and will not touch the basic problem. Certainly we need higher taxes to mop up inflationary pressures. I am not so sure, though, that higher taxes alone will handle the situation. At best it would take a long time to devise a detailed structure of taxes precisely tailored to the immediate needs, and rapidly adjustable to meet emergencies that are now unforeseeable. In spite of all their difficulties, we shall probably need some direct controls over prices, wages, and distribution of goods.

Dr. Johnson rightly stresses the need for programs to deal with low incomes in agriculture. He presents an excellent program for moving unproductive workers out of agriculture. I wish he had also included a program to help some of these people become more productive farmers. The domestic demand for food is expanding, and will continue to grow. We should not encourage workers to leave farms unless it is quite clear that they will be more productive in industry.

Apparently Dr. Johnson is not impressed with the need for a price-support program at present. Here I disagree. With all its shortcomings,

[18] Obviously home economists have performed much research in this area, but the most avidly discussed and promoted farm programs do not incorporate effectively their insights into an over-all farm policy oriented towards social efficiency.

[19] Cf. A. H. Anderson, "Space as a Social Cost," this *Journal*, August, 1950.

the farm-price-support program was, in my opinion, one of the most successful economic measures of World War II. We will need many farm adjustments in the next few years. Aren't we intelligent enough to develop a system of price supports that will encourage these adjustments?

While Professor Brekke does not give us immediate answers to specific problems, his paper merits careful study. It lays out broad economic and social objectives, and describes the research we economists must do if we are to give competent professional advice as to how these objectives can be reached. He rightly emphasizes the need for cooperation between the economist and other social scientists. The economist alone is not competent to judge "social efficiency."

To get some measure of social efficiency, Professor Brekke says we must construct a comprehensive model of the economic system; study possible adjustments in output, consumption, and prices; and determine what adjustments will maximize the welfare of society as a whole. This is a large order. It will never be done adequately, of course, but I think Professor Brekke is right that we must undertake the job and do as well as we can with it. And the recent work of Leontief, Koopmans, and others has made real progress toward the development of models that are comprehensive and realistic.

I agree fully with Professor Brekke's emphasis upon minimum standards for food, clothing, housing, medical care, and so on. A solution that provides a high total national income is not enough, unless all people can get the necessities of life. But I am rather skeptical of solutions obtained by maximizing any function, such as real national income, even if we allow for minimum standards. I do not believe that the economist, even with the help of the sociologist, can define what should be maximized to get the "optimum use of resources," or "maximum social efficiency." Therefore I think that we should use the models to work out a variety of alternative solutions. In our democratic country the voters will decide what they want. Our job is to advise them what alternatives are feasible, and what policies would be required to accomplish each of them.

AGRICULTURAL STATISTICS AS AN AID TO RESEARCH, SERVICE, AND ADMINISTRATION

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SOME twenty-five years ago when I first became aware of agricultural economics the key word in the then rapidly expanding young science was *statistics*. Statistics and statistical analysis were the main growing points, the chief centers of interest.

Times change. Today, so it seems to me, many of us are increasingly being lulled into taking our statistics for granted, especially the crop and livestock estimates and various other basic or closely allied materials, including farm income estimates and a wide range of index numbers which are derived from or used to summarize this basic material.

Fact is it seems our ability to talk theory or write abstract formulae is clearly outrunning our desires or ability to measure or find ways of checking. Perhaps all this adds to the easier and more frequent use of economics as an adjunct to the social and political arts, creating as it does an environment in which answers are simply assumed, and supposedly scientific developments are all too often only further elaborations around the accepted doctrines of the particular school, agency, or clique concerned. That is, we sometimes act as though *science* and *scientific achievement* were chiefly a matter of the company one keeps, judged in accord with the best fraternity spirit.

Perhaps I overstate the current trend. But in any event, I am glad of this opportunity to consider the problems associated with the collection and use of our statistical raw materials and I can think of no better way of beginning than to reaffirm an earlier belief:

Science is essentially a matter of stating conclusions and arranging materials so that others using the same data may come to the same conclusion; and one of its essential elements, especially economic science, is statistical measurement.

This discussion will be centered chiefly around what, for the use of a better term, we may call "general purpose" statistics; that is, around those statistics relating to agriculture and farm people which chiefly flow from the current estimates of the Federal-State

Crop Reporting Service, checked and supplemented at five-year intervals by the Census of Agriculture. These and various related series from other sources are the statistical raw materials with which so many of us work. They cover estimated crop acreages, yield and production, animal numbers and production, utilization of farm production, prices received and paid, etc., and with some elaboration are converted into various indexes and summary measures such as the index of prices and rates paid—the famous "parity index"—, the prices received index, indexes of farm output and food production, estimates of gross and realized net farm income, etc.

Sometimes these are simply thought of as materials collected or calculated for the general information of an undifferentiated public, as items to satisfy a mass curiosity. But this is far too simple a view. A study of the origin, or more surely of the continuing maintenance and growth, of any of the more flourishing sub-families in this field will usually indicate that there are particular classes of users who are vitally interested in the specific series in connection with their immediate farming, business, or administrative operations—that is, such series have an immediate *service* function. Further, such series are of interest to researchers and are also usually collected with attention to their *research function*. And finally, increasingly we find these same statistical series are being used to assist in measuring or conditioning mass behavior, or as essential administrative aids. That is, they have an *administrative* function.

This multiple use character of our agricultural estimates has both advantages and disadvantages. As an advantage it enables the collection on an organized, economical basis of a wide range of most useful statistical data as well as the calculation of a considerable number of summary series, often in index number form. A disadvantage is that such series are often a compromise, that they often fail to meet the precise specifications which would be laid down, could their use or purpose be more narrowly limited.

Research-wise, of course, the form and content of our statistical measures should be determined by the specific question at hand and we know that rarely will the same statistics precisely fit any two questions which are sufficiently different to warrant separate investigations. To this add the fact that the different classes of farmers or businessmen who use the data for service purposes

would often each like to see the available statistics more clearly fit their precise and often peculiar needs, as well as the further fact that interested Congressional committees, other policy determining groups, and specific administrative agencies have equally unique ideal requirements, and you begin to get some idea of the complexity of the problem.

To a considerable extent, this need for specialized statistics is met by the simple device of collecting specialized data. Almost any marketing or farm management research project, for example, includes the collection of certain essential data, so gathered as to fit the particular question at hand. Administrative agencies also necessarily collect special purpose statistics on occasion, as well as producing quite a bit of statistical material as a by-product of their administrative actions. But collecting special statistics is a relatively costly matter and, as a general rule, it is vastly more economical to proceed on an organized basis in those cases where there is a strong, continuing need.

But there is a further exacting requirement which must increasingly be considered in maintaining or developing these general purpose statistics, a requirement which revolves around the question of statistical significance or the ability to measure and state sampling errors. Statistical science has developed to the state where it is increasingly difficult to say simply that "these are the best estimates available on the basis of funds and time available." We want to know within what limits the various measures are significant. And this is a problem which is kept constantly before us, not only by our own statistical consciences, but equally by the various sampling experts, statistical laboratories, and the Division of Statistical Standards, Bureau of the Budget.

This by no means exhausts the perplexing problems which are associated with collecting, compiling and releasing general purpose statistics. Obviously, some nice jurisdictional questions are involved.

Should all general statistical functions be located in a specialized statistical agency such as the Bureau of the Census? The statistics task force of the Hoover Commission on Reorganization of the Federal Government faced this one and answered "No." I agree. That is, the task force recommended continuing the specialized statistics relating to agriculture in the U. S. Department of Agriculture, those relating to labor in the Department of Labor, etc.

recommending that provision for reviewing and coordinating all statistical activities falling within the Federal framework be assigned to some strengthened but nevertheless small central unit.[1]

But within Agriculture where should the statistical function be? Should the several state and federal bureaus compete in the collection of general purpose statistics? Obviously not, and one of the chief accomplishments of Mr. W. F. Callander, who retired as Chairman of the Crop Reporting Board last December 31, was the elimination of this tendency by working out a series of cooperative agreements between the various state agencies and the Bureau.

Should the statistical function within the Department be centered in or associated with a research agency as is now the case, within some special service or marketing agency, or associated with the Department's major administrative agency, currently the Production and Marketing Administration?[2] This is by no means an academic question. My own preference is easily stated. I believe the statistical and economic research functions belong together. This follows easily enough from my opening statement. But the recent report of the study group on Federal Agricultural Research of the House Committee on Agriculture indicates otherwise. That is, the majority recommendation would separate the statistical and research activities of the Bureau of Agricultural Economics as now organized, presumably placing them in separate parts of the Department.[3]

* * *

[1] See: *The Statistical Agencies of the Federal Government*, task force report with recommendations prepared for the Commission on the Organization of the Executive Branch of the Government by Frederick C. Mills and Clarence D. Long of the Research Staff of the National Bureau of Economic Research, released as Appendix D of the Commission's Report, Government Printing Office, January 1949.

[2] Perhaps I should make it clear that I know of no serious proposal to place the statistical functions with the Production and Marketing Administration or any other so-called "action" agency. There was some argument about this in the early days of the original Agricultural Adjustment Administration but it is generally accepted now that such items as county acreage and yield estimates as well as farm price and parity calculations are most useful coming from an independent source, provided the appropriate functions of the statisticians and the administrators are clearly defined.

[3] The Study Group did not directly recommend the separation of the statistical function. Rather, they recommended that "all agricultural research (as elsewhere defined) be conducted under the direction of one official of the Department" and that "all non-research now carried on within the existing research organizations be transferred." Statistical service, defined as "The collection, analysis, and dissemina-

The fact that the statistical functions of the Bureau of Agricultural Economics and related state and federal agencies have grown over the years indicates that the difficulties outlined above have been by no means insuperable; that there is a strong underlying demand for a wide range of statistical data, and that ways are being found for obtaining more detail, for either making general purpose data more useful or for obtaining certain necessary, more specific supplementary material.

As I see the developing situation, there is little doubt but that this trend toward an increasingly adequate statistical system will continue. It seems to me that there is no choice if we are to understand and on occasion take the necessary steps to assure the reasonably smooth functioning of an increasingly complex economy. This in itself raises a question. At the federal level especially we sometimes meet the question as to whether federally appropriated funds should be spent for gathering statistics not immediately related to national functions or over-all national planning. Such a limitation would seem to me excessively narrow; the first function of most of our statistics is now, and will I hope continue to be, to encourage intelligent individual and local action.

This does not mean that I am unaware of the value and meaning of over-all or national statistics. But the desire for local statistics must not be shunted aside. They allow the farmers and others in each small area better to realize their relation to the whole, they lead to a better interpretation of agricultural outlook and similar materials at the local level. The development of county and related statistical materials through the Federal-State Service also insures nation-wide comparability and costs less than would the maintenance of separate systems, while duplication is automatically eliminated. State agencies would not ordinarily cooperate with a service which was not interested in the problems which lie within the state itself.

But how are we to go about strengthening our statistical system, considering the steady drive for more and more economy in the ordinary running expenses of the government and the offsetting

tion of numerical information" was not considered as *agricultural research* which was defined as the "systematic inquiry into factors which affect plants or animals and the use of products therefrom." See report on *Federal Agricultural Research and Some Related Activities* submitted by a Study Group under chairmanship of D. Howard Doane to a Special Subcommittee of the House Agriculture Committee, July 10, 1950.

requirement for increasing attention to sampling errors or other measures of statistical significance?

The actual operating mechanics of this one are tough. Over the past several years the Bureau of Agricultural Economics has had considerable experience with enumerative surveys, proceeding on the basis of area or probability sampling and, to a considerable extent, open end questions or "depth interviewing." The idea here is by no means new; the use of direct personal interviews and controlled sampling has been a dream and ever-constant goal of some research statisticians and administrators within the Crop Reporting Service for almost three decades now. However, the fact remains that enumerative surveys are relatively expensive; sufficient funds simply are not forthcoming to allow their general use.

This doesn't mean the statisticians or statistically minded economists have stopped work or run out of ideas. By no means. We are still working on ways of getting more and better information via the older, much cheaper devices of mail questionnaire. Ways of strengthening mail questionnaire results with some supplemental interviewing seem possible. Questions are being raised as to how crop reports can be speeded up, farm price information made more precise, and additional marketing data developed.

A year ago there were some discussions of an essentially new approach to the Census of Agriculture. The suggestion was that consideration might be given to a complete Census of Agriculture only once every 10 years with the funds now going to the in-between or quinquennial census being used to carry forward a large scale sample census covering some 150 to 200 thousand farms each year, dividing the annual schedules between a small number of constantly recurring questions and a greater number of rotating questions on selected subjects, some of which would be asked every other year, some every two, three, four, or five years, depending upon the importance of the item covered.

Some further comment as to marketing data is perhaps in order. Since the enactment of the Research and Marketing Act there has been a great increase in marketing research. Some small portion of the funds have been used for the kind of regularly recurring general purpose statistics to which this discussion has been devoted. But such allotments have chiefly been made on the basis of supplying immediate services to various producer and marketing groups. Such work is well worth while, since a free market system

can function successfully only when all parties to the bargaining process have adequate information.

For the most part, however, such statistics as are coming from the Research and Marketing Act work are the specialized, often fragmentary special materials which are collected incident to specific research projects designed to achieve certain ends, usually the more efficient functioning of some marketing agency. Increased operating efficiency is certainly the goal toward which many studies should be directed. But it seems to me, as well as some others in the Bureau, that we need to develop certain statistical measures which will provide a continuing check on price spreads and certain general indications of marketing efficiency. We finally check outlook statements and support price announcements against an actual measure of prices received by farmers. Why not review price and marketing statistics and supplement them where necessary in order to provide at least a reasonably good measure against which marketing progress can be checked?

* * *

I think I've gone far enough. After all, I set out to make only a single point: *We take our basic statistics too much for granted.*

CURRENT FRONTIERS IN FARM PRICE DATA

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ACCORDING to one of the leading dictionaries of the English language a "frontier is the portion of the country between a civilized and an uncivilized region;" another defines a frontier as "a border, or advance region of thought." I am not sure that either definition is altogether apropos of our subject, but both definitions would seem to suggest that at a frontier, problems or issues of some sort are in the making, and both leave room for at least the hope that some problems are sometimes solved.

Moreover, if we consider how many of our current economic and social issues involve problems of pricing—more particularly prices of farm commodities; if we recall the problems of support and ceiling prices of the last war; and if we listen to the reverberations of discussions in the legislative halls even now of controls and ceiling prices, the idea of a frontier in respect to the collection of farm price data may not seem too far fetched.

In order to discuss briefly some of the problems in this frontier, and to indicate some of the steps being taken toward their solution, I think it will be helpful to sketch a bit of historical perspective. First, the prices with which we are primarily concerned are those relating to prices farmers receive for products they sell, and those farmers pay for things they buy.

The collection of *annual* data concerning *prices received by farmers* began in 1867. In 1908 the collection of monthly information for some items began, and 1910 saw further expansion of the list. Subsequently, the list of commodities was extended from time to time until now the Bureau of Agricultural Economics collects monthly prices for something like 125 commodities, including monthly prices for the more important commodities, and annual or season average prices for more than 90 other commodities. The concept of price which is involved is the price which we would get if somehow we could get together all the sales slips for all the farmers selling a given commodity in the whole United States, add up the total amount of money received by these farmers—regardless of the grade, location, or position of sale of the commodity—and divide this total by the total number of pounds, bushels, or

hundredweight of the commodity sold in all these transactions. As to location, all sales in the local market are included, together with local market price equivalents of sales at distant terminals. This is the average price received by farmers. This concept has been maintained for most series and it is in these terms that most parity computations are made. There are a few exceptions which will be commented upon later.

Beginning in 1910, a need was felt for information concerning the prices farmers paid for things they bought. Accordingly, collection of prices of 89 such commodities was begun then, and the list was expanded from time to time until the prices of nearly 500 commodities bought were collected in 1948 and 1949. Since then, there has been some reduction.

In the case of prices of commodities bought by farmers, the price concept has been slightly different from that in the case of commodities sold, and refers to the "price of the kind or type of item most commonly sold to farmers."

The method by which these data regarding prices received and paid were initially collected was through the use of questionnaires mailed to a corps of voluntary reporters who, without remuneration, returned questionnaires, giving their answers to the questions asked. The appeal for information rested largely upon the basis of cooperation in an undertaking for the general good, as in the case of the other Crop and Livestock Estimating work.

For data on *prices received*, lists were developed around produce dealers, grain and livestock buyers, mill and elevator operators, ginners, bankers, farmers, and sometimes others who were believed to have knowledge of local markets. For *prices paid by farmers*, recourse was had generally to dealers in the commodities being priced. Thus, grocery stores, clothing merchants, feed dealers, machinery and hardware dealers, automotive dealers, etc., were solicited for information concerning specified products in their respective lines.

These price data are used for a number of purposes, including the valuation of production, the computation of receipts from marketings, and the computation of gross farm income, farm expenditures, and net income. They have also provided most of the material for compiling the indexes of prices received and prices paid which are widely used in measuring changes in economic conditions affecting agriculture, and in computing parity prices.

The first indexes of prices received and prices paid prepared by the Bureau were developed in 1921 and 1928 respectively. During the 1920's and early 1930's these gained wide acceptance as primary criteria of agricultural conditions, with the parity comparison (that is the ratio of the index of prices received to the index of prices paid) attracting considerable attention.

With the enactment of the Agricultural Act of 1933, Congress declared it to be the national agricultural policy to "re-establish prices to farmers at a level that will give agricultural commodities a purchasing power with respect to articles that farmers buy, equivalent to the purchasing power of agricultural commodities in the base period. . . ."

The statistical means of determining the parity price of a commodity depended upon use of the data on prices received to give the base-period prices, and the use of the index of prices paid to indicate the extent to which prices received by farmers must advance if their purchasing power were to be equivalent to that in the base period.

But the concept of parity prices became more than merely a declaration of policy. The Agricultural Act of 1933, the Soil Conservation and Domestic Allotment Act of 1936, and the Agricultural Adjustment Act of 1938 all provided means of one kind or another for implementing this policy declaration, subject to certain conditions. Since then, the expansion of agricultural programs not only with respect to the number of commodities affected but also with respect to the nature of the activity by which price support is implemented is a matter of common knowledge. Similarly, pending control legislation contemplates making use of both parity prices and prices received data if and when ceilings become necessary. Thus, irrespective of whether a given program deals with loans, purchases, marketing agreements or orders, or ceiling prices, the starting point in virtually every case involves parity prices.

Obviously, the central position occupied by parity prices places a load of responsibility for administrative determinations upon the prices received and prices paid estimates, a burden which was rarely if ever dreamed of in the days when many of the original series were begun.

With the increased responsibility placed upon the data it might be supposed that a good deal of introspection might have occurred on the part of those who have been collecting the data, and this

has indeed been the case. It might also be supposed that others would display interest in them. This also has been the case, for the period from 1910 to the present is one in which there have been profound changes, not only in the nature and extent of agricultural programs, but also in production techniques and in marketing practices.

Back in 1910–14 the farmer-producer not only sold his product in relatively small lots, but he usually felt that there was little if anything that he individually, or even working together with his neighbors, could do about influencing farm product prices. For many commodities this is still true, but there are several areas in which the contrary is true. Thus, cooperative marketing organizations have come to have tremendous influence in some fields, handling vast quantities of produce. A large proportion of citrus fruit has long been marketed by one or another of the large cooperatives. The same is true for several of the other tree and nut crops. To a lesser degree it is true of apples, eggs, and poultry in the West, and of cranberries in the East. Milk marketing has become highly organized, with a structure probably unsurpassed for complexity. Finally, closely associated with these developments, have come grading, selling by grade, and the utilization of different grades for different purposes—some fruit going for fresh use, other for processing—these have brought profound changes in marketing and therefore in pricing practices.

Turning, for a moment, to the field of prices paid, the changes have been at least equally profound. Within the memory of many in this room agriculture has shifted from the era of horse and mule power to the era in which mechanical power is predominant in many if not all regions. And we have seen a transition from a farm economy which lived largely from the farm 40 years ago, to one in which, for commercial agriculture at least, the number and variety of purchases by farmers closely parallel those of an urban community. This is of great significance not only in the field of pricing these commodities, but with respect to giving each commodity its proper influence in an index.

This brief review is merely a reminder of the profound character of the changes that have occurred over the last 40 years or so.

To generalize and recapitulate, we can say then that two related factors have operated to develop special problems of pricing. One is the growing importance of the parity concept and

another is the marketing changes that have taken place in the last 40 years.

Time and your patience do not permit a detailed cataloging of these problems, but a listing of several of the more important categories, and some brief comments concerning our analyses and conclusions with respect to some of them will perhaps point up the character of the frontier as it stands today.

These problems may be discussed conveniently in the following categories:

(a) Basic limitations of the mail inquiry;
(b) Problems of sampling, including selectivity and bias (non-response and otherwise);
(c) Specific prices vs. over-all average prices;
(d) Problems of obtaining adequate weights for keeping the index numbers representative of current conditions; and
(e) The increasing types of outlets through which farmers buy their supplies, more particularly the growth of the mail order and chain store, in competition with the independent country store of a generation ago.

The first point—that is, the basic limitations of the mail inquiry—is clearly an important one, when it is recalled that the primary source of the data concerning both prices received and prices paid is still the mail questionnaire. In other words, with some exceptions the data are collected in much the same general way as in 1910. The mailing lists are larger and more complete, we are using more special lists, and the data are supported by considerably more intensive personal contact. Also, in the case of some commodities marketed through cooperatives, such as citrus, we are fortunate in securing from these organizations reports covering a large percentage of the marketings. Moreover, in special cases to be referred to later, more intensive methods have been developed. But basically, the resources available for this work have not permitted, except in special cases, the utilization of more intensive methods generally; and the mail questionnaire, which is almost certainly the least expensive method for collecting quickly many types of information over a broad area, still is our main standby for these basic data.

Characteristics of the mail survey have been studied at considerable length, and many of them are well known. The basic difficulties revolve around maintaining an adequate list of reporters, avoiding misconstruction of questions, and in applying probability

interpretive techniques. Some of these will be apparent as we proceed, and I shall return to a final remark on this general subject.

Turning now briefly to some of the problems of sampling, back in 1910 when the marketing of farm products was largely through local handlers dealing directly with producers, using a well distributed sample of informed reporters might reasonably be expected to result in an estimate of the average price which would not differ materially from the true average—using the term "true average" here in the sense of an average derived from complete knowledge of all sales. In other words, such items as different grades and location might be expected to be reported in about the proportion in which they occurred in the commodities marketed so that the sample would in effect be "self-weighted." But increasing tendencies to sell by grade, more clearly defined price differentials for grades or character of pack, and deeper channelization in the marketing process have brought about changes in this situation. This amounts to saying that the universe we are sampling has probably become more deeply stratified over this 40-year period, so that the difference in efficiency between a random sample and a stratified sample is doubtless much greater than it was 40 years ago.

Irrespective of whether this historical change has occurred, there is evidence that problems of stratification are significant now. The remedy seems to lie in building up an over-all average price from data for the several price strata by weighting them by the quantities marketed in the different strata. To some extent it has been possible to do this, particularly in the case of fruits, and in certain other cases there is at least a suspicion that the same procedure should be adopted, but this can be done only at the expense of a material increase in the work load. Some work has been conducted on this point and further work is clearly desirable.

Two cases will illustrate the point:

The first case relates to price of beef cattle. This is one of the series for which data are collected on the regular mid-month price questionnaires. The correspondent is asked to report the average price being received in his community for "beef cattle, liveweight, per hundred pounds." In a note at the head of the schedule he is asked to report "your estimate of the average prices received by farmers in your locality on or about the 15th of this month, for such products as you are familiar with. As only one quotation is

desired for each product, it should be representative of all transactions; that is, such a price as, if multiplied by the total quantity sold by farmers, would give the total value of all such sales." Estimates based partially on these quotations are published at the end of the current month. About a month later somewhat more complete information, representing the average cost to federally inspected packers, is available. These data do not cover all sales but only sales to federally inspected packers; this is around three-quarters of the beef-cattle slaughter. The coverage is more complete in some states than others, and in some it is somewhat fragmentary. In no case does it include prices of animals sold as feeders.

Moreover, cattle purchased by a packer in a given state do not necessarily originate in that state, so that the data on cost-to-packer of meat animals cannot be allocated accurately to farmers in individual states. Thus the cost-to-packer data for Illinois reflect a substantial number of cattle shipped into Chicago from neighboring states and cannot be interpreted as relating strictly to cattle sold by Illinois farmers.

Nevertheless, the cost-to-packer data represent a very substantial block of sales, and in the Middle West particularly, they are certainly strongly indicative of the trend in average prices. A historical comparison of the results from the mid-month price questionnaire with the cost-to-packer data (which become available too late for current use) indicates a strong upward bias in the mid-month quotations in the latter half of the year; this bias apparently being due to a tendency on the part of correspondents to base their estimates of trend in reported average prices pretty largely upon the trend in the price of steers and heifers, and to overlook the fact that a large part of the marketings in the fall usually consists of cows. As cows sell at a lower level than steers and heifers, they tend to pull down the average price received by farmers for all beef cattle. Historically, it has not been difficult to make revisions at the end of each year which probably reflect the true changes with a satisfactory degree of accuracy. The problem has been to make current estimates at the correct level from data which are known to be subject to a variable bias.

This problem was studied from several angles including charting methods, with the final result that funds were secured with which to use more intensive methods. The procedure adopted was that of direct enumeration from sales slips from the offices of principal

handlers of beef cattle, primarily commission firms and auction markets. The segment of the market represented by order buyers has been the most difficult to sample, and our efforts in this field have not yet been fully satisfactory. Even so, however, the sample from commission firms and auction markets has represented a very great improvement and has reduced end-of-the-year revisions to a very low level.

This enumeration is being carried on currently in 11 states, with out-of-state sales reported from three others. The sample states are distributed throughout the country so that the data provide a basis not only for evaluating the trend in these states, but also for making adjustments in the reported data from adjoining states.

Another bias of somewhat similar type has been studied in Kansas, under an RMA project. That study related to wheat. The Annual Report for the fiscal year ending June 30, 1950, prepared under the direction of Hubert Collins, State Statistician for Kansas, tells the story.

"A special mailing list of 598 representative wheat buyers has been established. Monthly schedules are used requesting information on prices by grades, proportion of total marketed in each grade, and protein content by grades. In addition, six line elevator operators each report on eight to 20 country elevators located in various locations in central and western Kansas. Reports are tabulated, edited, summarized, and price estimates made in keeping with the policies followed on regular price reports made by the Agricultural Estimates office. . . .

"From results of the special survey, it has been determined that the average price of wheat reported on the regular Agricultural Estimates mid-month prices received schedule usually corresponds with the price of No. 1 wheat. This regular schedule requests a single over-all average wheat price. In reality, the average wheat price varies from one to six cents below No. 1 wheat depending on the grades of wheat being marketed. . . . The proportion of wheat marketed in each grade as shown by this project is checked with grades of wheat received at Kansas City as reported by the Kansas State Grain Inspection Service. Also, the information on grade of wheat being marketed shown by the special survey is compared with quality information shown by the Preharvest Wheat Quality Survey."

These results have not been checked by personal enumeration, but the study indicates what can be done by mail if sufficiently intensive coverage and sufficiently detailed schedules are used. This study points to the need for similar studies in other states on similar commodities.

A third general type of problem relates to the increased need for the prices of specific grades of commodities at specific locations or marketing positions. The problem here is that farmers, in making sales, and federal agencies in conducting programs, cannot operate in terms of an average price for a commodity. Farmer Jones does not sell average potatoes. He sells potatoes of a certain grade or grades, which may be either in bulk or sacked. If a federal agency is to undertake activity of a price-support character in a realistic fashion it must deal in terms of prices of particular grades of a commodity at a particular locality. The marketing agencies, therefore, have need for more specific or more adequate price information than has been available to date. Similarly, studies of marketing margins require more specific price data.

It has been said that parity prices, generally speaking, have been established in terms of an average for all of the commodity sold. There are a few exceptions, principally in the case of citrus fruits for which parity has been established on the basis of what is known as "equivalent on-tree returns for all methods of sale." This means simply that sales at all the positions—such as "on-tree," "incoming packing-house-door," or "f.o.b.,"—are discounted back to the "on-tree" position by making a deduction from sales at any other position to reflect the costs of moving the fruit from on-tree to the position at which it is actually sold. Similarly, parity prices have been established for a number of fruits and vegetables for fresh use and for the same fruits and vegetables for processing. These have been construed as separate commodities under the terms of the Act.

With respect to retail prices paid by farmers, there are a multitude of similar problems. One of overshadowing importance is that of securing satisfactory data concerning quantities of goods purchased by farmers. These data are needed for use in making the revisions in the parity index which are necessary from time to time in order that the index may reflect modern conditions. In the first parity index, which used weights for the period 1924–28, the quantities purchased were based upon several miscellaneous

surveys, largely of a farm-management character, but also including studies of rural life and family living. The data were the best available but were not up to the standards now required by most statisticians. The recent revision of the Bureau's parity index drew heavily upon census data, reports of trade associations, results of special surveys, and the results of two surveys of family expenditures: (1) "Consumer Expenditures in the United States," a study made in 1935–36 by the Bureau of Human Nutrition and Home Economics and the Bureau of Labor Statistics under the auspices of the National Resources Committee, and (2) "Rural Family Spending and Saving in War Time," a study made in 1941–42 by the Bureau of Human Nutrition and Home Economics and the Bureau of Labor Statistics.

Looking forward to the future, we are now in a *post-World War II Era.* Our parity index is using weights based upon the last reasonably stable period prior to World War II. It seems reasonable that an effort should be made to learn of farmers' buying habits in this postwar world. It appears that such a study should be made on an enumerative basis, utilizing the sampling techniques which have been developed in recent years and which have been used effectively by both governmental and non-governmental organizations. Such a study should cover commodities used by farmers both for living purposes and for production purposes and, in my judgment, should be conducted on a nation-wide basis to reflect purchasing habits the country over. It should be conducted with sufficient intensity to permit making reasonably satisfactory estimates at the regional, and possibly at the state, level.

A survey, which in many respects may be regarded as a pilot study, was made in Montana in June of this year. It was made through the cooperative efforts of the Bureau of Reclamation of the Department of the Interior, the Montana State College, and the Bureau of Human Nutrition and Home Economics and the Bureau of Agricultural Economics of the Department of Agriculture. The field work was carried out under the direction of the State Agricultural Statistician, Preston J. Creer. The purpose was to obtain data on actual expenditures for various commodities purchased, for use in a prices paid index for the State of Montana, and to provide data for family-living analyses.

The universe was defined to include all farmers resident in the state whether or not they lived on the farms they operated. Places

of less than three acres were not considered farms, nor were those whose annual product was valued at less than $150. The farmers to be enumerated were selected on the basis of an area sample estimated to yield around 600 records. In drawing the area sample, the state was stratified by type-of-farming areas and level of income. Fifteen strata each containing about 2,500 farms were delineated along county lines. These groupings were made in such a manner that the counties in any stratum were of approximately the same average income level. From each stratum, one county was drawn with probability proportional to the total number of the farms in the stratum. Within these counties, 186 segments of about four farms each were picked for enumeration, with probabilities inversely proportional to the income of farms. Open country, villages, and towns were sampled at the same rate. In all, the current count indicates about 512 usable records. This number reflects some refusals, some misunderstandings on the part of some enumerators, and some tendency for the number of farms to run under the estimate based on the 1945 Census. When data from the survey are available, they will supply specific information for use in preparing a Prices Paid Index for the State of Montana, and the administrative experience should be helpful in planning further work of this character.

Another field of inquiry which needs exploration is the field of costs of services to farmers. In the last revision of the parity index the costs of electricity and telephone service were added. A component representing medical services should also be added. These medical services have never been included in the index because the information has not been available. It is estimated, however, that the combined cost of medical, dental, and hospital services cost farmers somewhere in the neighborhood of $370 million in 1941. Exploratory work was conducted in 1947 for the purpose of developing techniques for collecting cost rates of these services.

This project set up a method of selecting a probability sample of doctors, dentists, and hospitals, and included the small-scale collection of data. The techniques can be extended or modified whenever resources are available.

In the field of collecting prices paid by farmers for commodities and services, one of the complicating factors is the growth in the types of outlets. In the base period the main source from which

a farmer secured his supplies was the local merchant—the general store, the grocery store, the hardware and implement dealer, and the grist mill. The mail order house, too, was getting well established. The 40 years since then has seen the development of the chain store and the cooperatives as additional channels through which farmers buy their supplies. It has not been feasible for our data-collecting machinery to cover all of these sources adequately. At present, we are dependent primarily upon reports received quarterly from independent dealers scattered throughout the country. For purposes of current estimation in the inter-quarterly months we are mainly dependent upon a smaller sample consisting of chain stores. The complete coverage of the retail purchases of farmers would require covering these additional outlets, together with information concerning quantities purchased in each type of outlet. This field has been merely skimmed owing to the limited resources available.

The over-all problems connected with mail questionnaires and the need felt for more intensive methods are ever present. Problems of maintaining mailing lists have been intensified by the growth in the number of agencies collecting information, by the increasing amount of information which seems to be necessary in our modern complex economy, and by the recollection of irritations associated with wartime controls, negotiations, scarcities, and inconveniences. In an attempt to explore these last two fields the Bureau has undertaken a project under contract with the Institute of Statistics at the University of North Carolina. The purpose is several-fold and includes (1) development of methodology, (2) comparison of the results with those secured by the mail questionnaire, and (3) an analysis of the costs of the enumerative approach.

The project was begun in the late summer of 1949 and will not be concluded until the spring of 1951. The first stage consisted of an investigation into the purchasing and selling habits of farmers to ascertain the channels and the size of towns through which they sold their products and bought their supplies. Approximately 1,000 farmers were interviewed, and information was collected concerning where they sold their produce, where the sale was made, and the name and type of dealers with whom they dealt. Similar information was collected concerning where they bought a list of commodities for living purposes and for operating their farms. This provides data for a fairly comprehensive analysis of the type of

dealers, and size of town where farmers buy and sell, together with several related factors. On the basis of this survey a sample was designed for collecting price information in the various strata.

The price surveys are not complete, and the results to date have been only partly analyzed. But when the study is finished, it is expected to throw considerable additional light upon the relation between prices collected by mail under the procedures which are being used currently and those which are developed by enumeration. It should also throw additional light upon the nature of the variation in the universe of prices being sampled, and upon the strata which are significant from a sampling point of view. This will aid in improving our sample designs. Strictly speaking, of course, these results will be applicable only to North Carolina or the areas where conditions are generally similar, but they should be strongly indicative of the most fruitful avenues for work in other areas.

Finally, this survey of some of our more pressing problems is not complete, but it is fairly representative, and indicates something of our efforts to improve our basic statistics in this area.

To return to our initial analogy, we can say, I think, that the main outposts of our frontier of price-collecting activities are reasonably secure, but the line has not been completely stabilized, and much intensive effort will be necessary to realize the standards of adequacy which are desirable.

DISCUSSION

HENRY M. TAYLOR
Agricultural Statistician for Virginia

Mr. Stauber has made an excellent statement concerning the problems involved in the collection of farm prices and in constructing indexes of such prices, and I would like only to emphasize several items in his paper.

Those of us who are responsible for the collection of farm price data fully realize the difficulties which Mr. Stauber mentioned. It is harder to get farmers, merchants, and others who buy from and sell to farmers to report prices than was the case 15 or 20 years ago. Our experience in Virginia shows that there has been a decrease in the percentage of replies to various price inquiries during the past 10 years. An examination of the return for our mid-month Prices Received by Farmers schedules which are mailed to about 500 farmers, merchants, etc., shows the following:

Four-year average 1938–41	58.8% returned
1942–45	64.5% returned
1946–49	55.1% returned

Not only has the percentage of returns declined since the War period, but, as Mr. Stauber has noted in his paper, recruiting new reporters is now more difficult. When I have heard economists discussing production and price trends at outlook meetings, the thought has occurred to me that these speakers have a wonderful opportunity to improve the returns by making a brief statement, such as "The figures and prices which I have just mentioned are based upon reports which many of you have made to your State Agricultural Statistician, and I want to urge that whenever you receive these inquiries that you take a few minutes to fill them out because they really are important."

Mr. Stauber has mentioned the new uses which have been made of farm price statistics in computing parity prices and income, so accurate prices are absolutely necessary under present governmental policies. The changes in marketing have made it necessary to collect prices for various methods of sale. For instance, apple and orange prices are now greatly affected by the percentage of these crops which are sold to processors. When these crops are shipped to market, packing and container prices are included; whereas when they are sold to processors, such costs are eliminated. The percentage of these crops sold for fresh market and for processing varies from year to year, hence an average price of applies or oranges may not show over a period of years the true trend in the different methods of sale. Thus, the Department of Agriculture has found it necessary to report these prices on an "on-tree" or "packing-house-door" basis. Such prices are, of course, not on the same basis as prices collected 20 or 30 years ago. Therefore, the older prices have to be revised and changed to the new base.

The Department of Agriculture has recognized that changing conditions have made new methods of collecting prices necessary, and Mr. Stauber has mentioned a number of new approaches. He has also pointed out that the mail inquiry is by far the most economical method of collecting prices, as well as the quickest, so this method will continue to be the principal one used. Therefore, every possible means must be employed to recruit new reporters and to increase the percentage of returns from all who have agreed to report.

In closing I want to say that there are other price frontiers which we must not overlook while giving attention to the problems on price collection. In the field offices the majority of requests for price data comes from farmers, local businessmen, the press, and workers serving agriculture at the state and county levels. Their needs for price information are largely directed at making comparisons in price relationships for the state and smaller areas. The field office statistician is continually trying to service these requests within the limitations of available data. A uniform system of preparing state index numbers of prices received and prices paid by farmers, patterned after the methods used in preparing the national indexes, should be worked out and used in each state by the field offices. Such a program would be of material help in making comparisons of agriculture price trends among states and with the national picture. Also comparable methods of applying seasonal adjustments, computing feed-cost livestock price relationships and preparing ratios between prices

received and prices paid in order to show farm purchasing power need to be standardized for use in all states in order that our price statistics can more effectively meet the needs of the general public.

At the state level workers are interested in filling certain obvious gaps in price data. For example, small family farms are becoming more and more dependent upon having certain farm work done on a custom or rental basis with machines owned by others. Generally data on these farm costs are lacking, and filling gaps such as this is of more interest at the state level than more detail and refinement in existing material, a fact which is emphasized in Mr. Stauber's paper.

DISCUSSION

DON PAARLBERG
Purdue University

The statistical services of the United States Department of Agriculture are the best in the world. That fact was impressed on me last summer at the International Conference of Agricultural Economists at Stresa, Italy. Most of the other countries of the world have agricultural statistical services that are skimpy at best. For comprehensiveness, timeliness and accuracy our agricultural statistical services are unsurpassed.

As Mr. Wells pointed out and Mr. Stauber amplified, our statistical services were begun with the threefold objective:

1. Service to farmers
2. Tools for research
3. Aids to administration

Now, after forty years, we see the order of importance of these objectives shifted about. Our price indexes, once intended for research, have become a gauge to regulate the flow of federal dollars into the farmer's pocket. Our statistics on production, intended for promoting changes in farm organization, have become the basis of allotments which inhibit the very changes they were originally intended to foster.

Whether all this is good or bad is not now my primary concern. But one thing is sure; if we are to be accountants rather than analysts, if we are to run errands rather than find relationships, then we may as well give up trying to build a science or call ourselves economists. In much of the world today, an "agricultural economist" is one who gathers certain figures from farmers and arranges them conveniently so that an administrator may decide what the farmer is to do. Let us hope that such does not become the role of agricultural economists in the United States.

* * *

The current frontier in farm price data is, I believe, the frontier that was visualized when our statistical services were begun—the analysis of data, the discovery of relationships, the building up of a body of science so as better to serve the needs of farmers.

We have made tremendous progress in the assembling of data on a wide

variety of subjects and commodities, but we have done relatively little in the interpreting of this material. Our job isn't complete until we have put our findings into form so that they can be used in outlook work and directly with farmers. This means analysis. This work should be done, not by the people who collect the data, but by analysts in the Bureau of Agricultural Economics and in the Agricultural Colleges. We have been doing some work along that line at Purdue. Here are a few of our findings:

Early in December we can predict the number of sows to farrow the following spring simply by studying prices of corn and hogs. This is prior to the availability of the December pig crop estimates, and in time to change the scale of operations.
From the prospective corn supply, we can predict not only the number of cattle which will be fed, but also the price of feeder cattle. This can be done as soon as the size of the corn crop is known.
As early as March, a reliable estimate of the number of hens and pullets on hand the next January can be made by the use of December-February price relationships.

No doubt many useful relationships can be found by subjecting our data to analysis. This is not a new frontier; it is the original frontier and one deserving of renewed attention.

* * *

The mailed questionnaire method of reporting prices has been under fire, of course, as Mr. Stauber indicates. The attack on this method centers chiefly on the representativeness of the sample and errors of response, both voluntary and involuntary.

In my opinion, for the purposes to which reporting is put, these errors are not so serious a handicap as to cause us to consider abandoning the mailed questionnaire. It is true that the better farmers return the questionnaires and the poorer ones do not, thus making a representative sample impossible. But do the better farmers receive a higher or lower price than the poorer farmers? Our farm management surveys indicate no significant relationship between farming ability and price received, so that an unrepresentative sample in this case does not handicap our results.

Undoubtedly there are errors of response; however, it is necessary to ask whether errors of response are reasonably consistent throughout time. If they are, and if the errors are known, the results of the mailed questionnaire meet the purpose for which they were designed.

* * *

Improved accuracy of our statistical reports and addition of needed services are desirable within the limits of reasonable cost. It is my belief, however, that the real frontier in farm price work lies in the analysis of price relationships to sharpen our outlook work, increase the real service to farmers, and build up the body of our science. Whether the price of wheat is to be reported as $1.93 or $1.92 is not so important as the relationship of the price of wheat to the supply, to the price of bread and the price of bran, and to the acreage of wheat the following year. We can make our statistical services forward looking.

TRENDS IN THE CONSUMPTION OF TOBACCO PRODUCTS, UNITED STATES, 1900–1950

ELMO L. JACKSON
Vanderbilt University

THE writer has been fortunate enough to have worked on several occasions during the past decade with confidential data descriptive of the consumption of tobacco products. This paper serves as a vehicle to present some of this descriptive material within the framework of a brief analysis of the principal developments of the usage of tobacco products in the United States during the last 50 years. The organization is such that Part I contains a short graphic summary of these developments and Part II considers them analytically. A statistical note at the end contains tabulations of the new additions to tobacco statistics.[1]

PART I

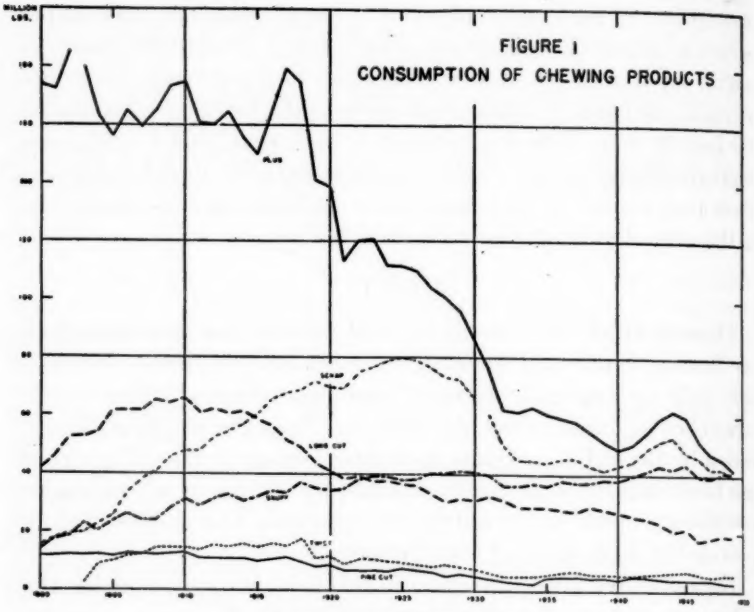
There is within the classification of tobacco products for which the Bureau of Internal Revenue compiles and publishes consumption data an aggregate termed "smoking tobacco." Since 1931, scrap chewing tobacco has been removed from the smoking classification by the B.I.R. and has been reported separately. The writer has been able to make fairly satisfactory estimates of the major components of the smoking-tobacco aggregate, and these new data provide the main reason for this paper.

The estimates give approximate levels of consumption for the following products for the years indicated: (1) scrap chewing, 1900–1930; (2) long cut chewing and smoking, 1900–1949; (3) granulated smoking, 1900–1949; (4) plug cut smoking, 1900–1949; and (5) cigarette cut smoking, 1931–1949.[2]

[1] Part of this statistical material is taken from the writer's unpublished doctoral dissertation, *The Consumption of Tobacco Products*, Harvard University, March 1942. Recently, some of these data have been revised and brought up-to-date as a by-product of a research project at Vanderbilt University financed by the Agricultural Research Administration, U.S.D.A. The writer is also indebted to the tobacco trade which has cooperated fully with the research project at Vanderbilt.

[2] For a detailed description of these "products," the reader is referred to the sources cited in this paper. Typical brands are:
1) for scrap chewing (*Mail Pouch, Red Man, Beech Nut*);
2) for long cut (*Five Brothers, Tip Top, Miner's Choice, Summertime, Eight Brothers, Old Rover*);
3) for granulated (*Stud, Golden Grain, Bull Durham, Country Gentleman*);
4) for plug cut (*Sir Walter Raleigh, Granger, Prince Albert, Edgeworth, Tuxedo*);
5) for cigarette cut (*Ripple, Target, Top, Roll Rite*).

Long cut tobacco is consumed mostly (about 70 percent) by chewing. Historigrams of long cut and scrap, together with the well-known chewing products—plug, snuff, twist, and fine cut—are presented in Figure 1. The individual trends are clearly apparent. An analysis of the trends in each of these products is not made in this paper, but the trend of chewing products as a group is discussed in Part II.



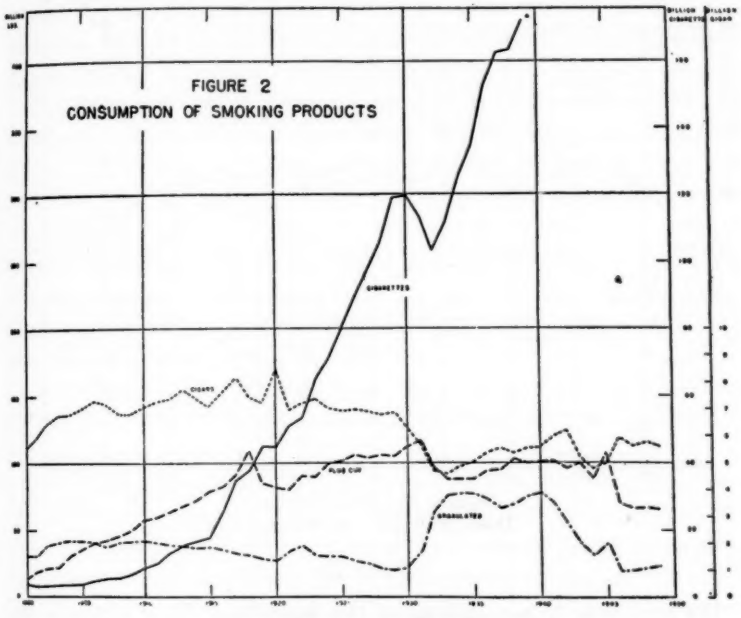
Source: see statistical note.

The smoking products—large cigars, small cigarettes, plug-cut, and granulated—are individually shown in Figure 2.[3] In this chart, the estimates of cigarette cut tobacco are combined with those of granulated, in order to prevent the approximate disclosure of the sales of the one large manufacturer of this depression-born product.[4] The extremely minor smoking products (large cigarettes and small cigars) are not shown, although they are included in the smoking

[3] The left-hand scale of this chart, in terms of pounds, is roughly applicable to all of the line graphs; the assumptions being that 1,000 cigarettes weigh 2.5 pounds, and that 1,000 large cigars weigh 20 pounds.

[4] Although it is not possible to make public the absolute volume of cigarette cut tobacco, relatives of these estimates are plotted in Figure 4.

aggregate of Figure 3. It is also necessary to use Figure 3 for a complete graph of cigarette consumption.[5] During the last decade of the 50-year period, cigarette consumption approximately doubled, making it impractical to plot cigarettes for 1939–49, on Figure 2, without a considerable dwarfing of the scale for the other smoking products. In Part II, the trends of each of the products charted in Figure 2 are examined.

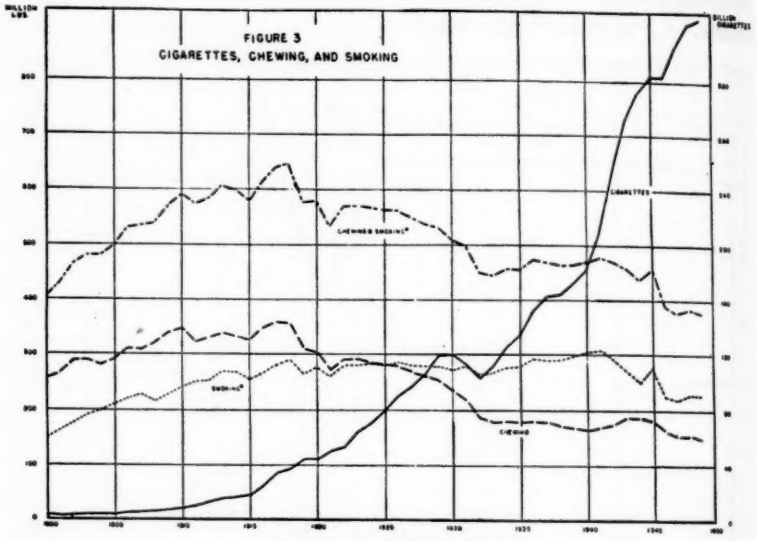


* For 1940–49, see Figure 3.
Source: see statistical note.

One further chart (Figure 4) is required as a descriptive foundation for the analysis below. This chart is concerned with the impact of cyclical fluctuations upon tobacco consumption, and will serve as a means for helping us distinguish trend from cycle. In this chart are displayed the "cigarette-products"—those commodities which more and more have come to serve as substitutes for the accepted brands of manufactured cigarettes during periods of reduced income. These cigarette-products include: (a) consumer-

[5] The primary purpose of Figure 3, however, is to compare the consumption of the cigarette with the consumption of all other products. The left-hand scale has the same design as Figure 2.

made (roll-your-own) cigarettes, (b) economy brand cigarettes, and (c) granulated and cigarette cut smoking tobacco.[6] It is believed that these cigarette-products all have negative income elasticities, for they bear a marked inverse relationship with changes in real family income.



Source: see statistical note.
* Does not include small cigarettes.

PART II

We turn now to an analysis of the important fluctuations in the consumption of tobacco products during the last 50 years.

Chewing Products.—The downward trend in chewing tobacco as a group is primarily due to the failure of these products to attract sufficient new users after the first two decades of this period. The only possible exception is snuff. The reasons for this failure can be listed with little comment:

(1) Chewing products are untidy to use. The housewife has always objected to them in the house, and city ordinances objected to their free use in town. These forces localized the consumption of

[6] Some of the plug cut brands have had important outlets in consumer-made cigarettes, and for this reason plug cut tobacco is partially a cigarette-product. On the other hand, many plug cut brands are used regularly by confirmed pipe smokers. It is this dual use of plug cut tobacco that prevents the downward trend in pipe smoking from being clearly apparent in Figure 2.

such products to workers on farms and to those occupations, mainly coal mining and petroleum extraction, where untidiness is not objectionable; and where chewing products were the only products that could be used without an interruption in work. Smoking was also so dangerous in some of these jobs that it was prohibited.

(2) The total work force and hours in the locales described above have decreased, especially on the farm.

(3) Chewing products have not received the promotion that was given smoking products, particularly cigarettes. Advertising makes a poor showing when used to counter a trend.

The small upturn in chewing use during the period of War II substantiates the reasons listed above. For it was at this time that employment hours in the occupations listed increased; this was certainly true in the munitions industry where smoking while working was usually not allowed, The fact that this upturn was not sharper is a clear indication that many workers new to these industries were unable to switch their tobacco-using habits. Augmented incomes and the shortage of cigarettes in 1944 and 1945 played a small part in this upturn.

Cigarettes.—Forces operating on the upward trend of cigarette consumption are more numerous and it is not easy to list them in order of importance:

(1) Within the population variable are four factors of an important secular nature—(a) the increase in total population; (b) the increase in the relative importance of individuals of a tobacco-using age;[7] (c) the great expansion in the number of cigarette users brought about by a change in the proportion of adult tobacco users to the total population (i.e., a decline in the non-user) and (d) the changes in population location from rural to urban and suburban.[8] All of these population factors are important, although "c" is a result and not a cause. The major victory of the cigarette was its adoption by women. No other tobacco product had previously received any but negligible patronage by women, and this continues to be the case. Consumption by women was clandestine at first, but before the twenties were over, it had become so prev-

[7] In this connection see Gage, Charles E.; *American Tobacco Types, Uses, and Markets*, Circular No. 249, U.S.D.A. (June 1942), pp. 113–114.

[8] The consumer expenditure study, made in the mid-thirties by several agencies of the Federal Government, shows that with income level held constant the average expenditure per family for cigarettes is much higher in urban locations than in farm locations. See: *Family Expenditure in the United States* (Natl. Resc. Pl. Bd., 1941), pp. 55, 60, and 65.

alent that the public openly accepted the fact, and manufacturers were boldly advertising and encouraging feminine usage of the cigarette. During the thirties, this use continued to expand, so that by the 1940's, a generation of women cigarette smokers had had time to influence the tobacco tastes of its offspring—a plain case of a trend begetting a trend.

(2) Promotion: The advertising budgets of the important cigarette manufacturers have been very largely devoted to cigarettes since the early teens.[9] These budgets expanded in size until the thirties, when they were somewhat moderated. During the last five years advertising expenditures for cigarettes appear to have resumed their upward trend. For products other than cigarettes, the tobacco companies have relied principally on the activities of their salesmen in the field and the "drop shipment." Sales promotion has been the important problem of each firm, especially the promotion of a standard brand cigarette.

The effect of this large advertising effort on the total consumption of cigarettes cannot be measured quantitatively. Professor Neil H. Borden in his *The Economic Effects of Advertising* states: "Without advertising, cigarette use would probably have grown; with advertising, the increases has been amazing" (p. 228). This conclusion is founded upon an anlysis which is confident that cigarette advertising was forceful in (a) breaking down social prejudices against the cigarette, (b) speeding up female acceptance, (c) providing evidence that cigarette-use was a proper social habit. Cigarette advertising has thus served to hasten the conversion of users from other forms of tobacco products, but primarily to quicken the enlistment of new users of tobacco. According to Borden, cigarettes in 1935 were used by 50 percent of the adult male population and 20 percent of the adult females—a sizable growth from 1910, when its use was limited to a very small percentage of men and to a negligible fraction of women (*op. cit.*, p. 221).

Aside from the effect upon total cigarette consumption, advertising has played an important role in the users' valuation of classes of cigarettes. This valuation and its relationship to the consumption of the cigarette-products are discussed below.

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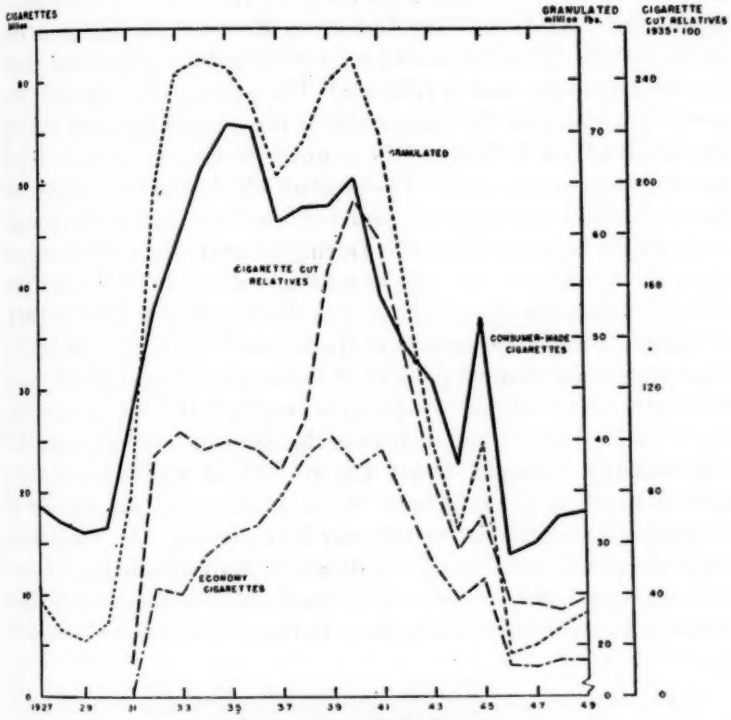
[9] The advertising expenditures on the three largest brands of cigarettes, for example, averaged during 1928–39 about 85 percent of the total advertising expenditures for all products, except cigars, of the firms making these brands.

(3) The upward trend in real income: Manufactured cigarettes are not expensive, but almost the same tobacco-satisfaction can be derived from cheaper products such as pipe tobaccos or the cigarette-products. Some idea of the importance of this factor is afforded by Figure 4 which graphs the consumption of the cigarette-

FIGURE 4

CONSUMPTION OF CIGARETTE PRODUCTS



Source: see statistical note.

products before, during, and after the Depression; and which also shows how these products were turned to during the cigarette shortages of 1944 and 1945.

The factors listed above are no doubt the main forces operating on the trend of cigarette consumption. Yet they surely do not provide an explanation of the doubling of cigarette consumption during the decade of the forties. At this time the secular forces were strengthened by a prolonged cyclical upturn in employment and

income, causing a rapid shift away from consumer-made cigarettes (see Figure 4) to manufactured cigarettes (see Figure 3).[10] Furthermore, cyclical upturns in income have always been marked by increased usage per smoker.[11]

Are there war-time forces other than high income and employment which can explain further the remarkable increase in cigarette consumption during the forties? It is almost universally believed that the stress of war increases the total desire for tobacco satisfaction. In War I, the War Industries Board estimated that the soldiers of the Allied Armies were consuming 60 or 70 percent more tobacco than they had in civil life.[12] The placing of tobacco in the overseas ration and the campaigns of many organizations raising free smokes both influenced the country to look with more favor upon tobacco consumption. The product which benefited most from these activities was plug cut smoking (preferred overseas because of its better keeping qualities). During War II, the manufactured cigarette was almost the sole beneficiary of the same forces. The ration overseas was five times greater than in War I. During 1944, 10 cigarette manufacturers sold the armed forces over 80 billion cigarettes, more than 25 percent of the consumption of that year. So great was the volume of cigarettes moving to the armed services that a shortage developed in 1944 in the domestic civilian market.[13] This shortage brought about the revival of cigarette-products already mentioned (see Figure 4), and this situation served to increase consumption after the war was over, as the temporary usage of cigarette substitutes was dropped. The continuation of war-time smoking habits coupled with good times has caused further increases in cigarette consumption, but at a much more moderate pace.

[10] All cigarette series, except the consumer-made series of Figure 4, are of manufactured cigarettes. Thus they include the economy-brand cigarettes. The doubling of cigarette consumption during the forties therefore cannot be partially explained by the practical disappearance of the economy brands.

[11] It can be clearly shown that during periods of high unemployment and reduced incomes, tobacco users cut down tobacco consumption. This follows from the direct relationship between total real income and total leaf consumption, as measured by leaf used in manufacture. Shifts to cheaper products, or substitutions of any sort, are allowed for by compounding all tobacco products into the aggregate, leaf-used. Thus, in spite of the known shifts, this relationship establishes that unemployment and reduced incomes depress total tobacco consumption, regardless of the urgency of the tobacco desire. It must follow, therefore, that increased income and employment have the opposite effect.

[12] War Industries Board, Price Bulletin #19, p. 6.

[13] Federal Trade Commission, *The Cigarette Shortage*, p. 16. Total purchases were even greater still, for the figure given does not include tax-paid purchases.

Standing in 1950 and looking back at the secular forces which have operated upon total cigarette consumption, it is interesting to speculate how many of these will continue into the future. It is not believed that the rural-urban pattern, income constant, of 15 years ago is of much importance today; nor is prejudice a matter of concern to copy writers. Future long-run increases will come from (1) a greater intensity of use per smoker (unless medical opinion counteracts this trend); (2) steady increases through population growth, changes in the age distribution, and the continuous adoption of the cigarette by each wave of new adults; (3) the conversion of users of other forms of tobacco products; and (4) the increases in real income. Lacking any further segments of the population to develop into cigarette users, lacking prejudice and the other forces it helped overcome, advertising is bound to play a more passive role in the expansion of total consumption. Thus advertising can be expected to become even more combative than it has been in the past.

Smoking Products.—Except for cigars, the smoking products other than cigarettes do not have any well-confirmed recent trends. Consumption of granulated and cigarette cut, and to some extent the granulated plug cuts, are too sensitive to changes in the average family's economic outlook; and during the last 20 years, fluctuations in this outlook have obscured any trend that may be present. It will take a long time before these trends will assert themselves, unless you are willing to grant prompt and continuous secular increases in real income and the virtual disappearance of the business cycle; for cigarette consumption has reached such large proportions that any rise in unemployment (or any event that pinches family income severely) will cause increasingly larger changes in the short-run usage of the cigarette-products.

Although cigars recovered considerably during the forties, I believe it is safe to conclude that a downward trend has existed since the late twenties. This product, for reasons unknown to the writer, is not attracting new users.

In closing this brief analysis of the principal trends of tobacco consumption, I am sure that it is unnecessary to warn the reader that the speculative parts should be considered very tentative. Just eight years ago, for instance, I was sure that the 10¢ cigarettes were well established, even though I knew some temporary factors were responsible for their success (e.g. cheap, good quality leaf of the

early thirties, and the 10¢ price which even in 1940 was on the way out with the spread of state and local taxes on cigarettes). The 1940's brought their almost complete death. Manufacturers of these brands are now seeking a federal tax structure that will permit a five cents difference in the retail prices of the economy and the standard brands. Whether such a graduated tax would cause a revival in the economy brands, other things remaining the same, is now seen in the light of the 1940's as very problematical. This decade demonstrated very firmly that the 10¢ cigarette was adopted primarily under conditions of the economic duress of the thirties; it could not stand up as an independent product in the face of large improvements in the economic position of families and the well-advertised prestige of the standard brand. The 1950's could just as easily cast a different light on some of the conclusions reached above.

Statistical Note

Tables I and II, herein, present the new additions to tobacco statistics. A source note accompanies Table II. The following facts summarize the basis of the estimates made in Table I:

(a) For 1929–49, inclusive the following manufacturers reported to the writer their sales (or production) of plug cut, long cut, cigarette cut, and granulated products: American, Bloch Brothers, Brown & Williamson, Liggett & Myers, P. Lorillard, Philip Morris, R. J. Reynolds, and United States Tobacco Company. These data were totaled for the four classes of products, and these totals were expanded *pro rata* to equal the total "smoking" tobacco production reported by the B.I.R. For 1929 and 1930, years in which scrap chewing tobacco was also included in the B.I.R.'s smoking classification, the total smoking was first reduced by subtracting the estimate of scrap chewing.

(b) Details of the estimates of scrap chewing, granulated, plug cut, and long cut, for the other years of Table I are given in Appendix B of the writer's doctoral dissertation cited above. The basic sources of these earlier estimates are: (1) confidential data supplied by the tobacco trade to the Tobacco Section of the old AAA of the Department of Agriculture during the period of processing taxes, (2) Part III of the *Report of the Commissioner of Corporations on the Tobacco Industry*, and (3) "Prices of Tobacco," Senate Document 878, 61st Congress, 1st session, p. 140.

(c) All of the final estimates of the classes of products indicated add up to the total production of smoking tobacco reported by the B.I.R. Horizontal lines in Table I indicate breaks in homogeneity of the basis on which the estimates were made. At these points, year-to-year movements should be interpreted with caution.

(d) The estimates of scrap chewing in Table I are very similar to those made for 1905–1930 by Professor Henry H. Bakken of the University of

Table I. Estimates of Consumption of the Components of the Smoking Classification of the Bureau of Internal Revenue, 1900–49

Calendar Year	Plug Cut	Scrap Chewing*	Granulated†	Long Cut	Cigarette Cut, Relatives‡
	million pounds				percent
1900	13.9	15.6	30.4	41.7	
01	18.2	17.9	30.1	45.9	
02	21.0	19.5	38.2	52.4	
03	21.7	19.8	40.4	52.5	
04	30.1	22.9	41.8	54.3	
05	35.6	26.3	41.8	61.6	
06	40.0	33.6	40.4	61.7	
07	42.1	38.0	37.6	61.5	
08	45.5	40.6	40.7	65.4	
09	50.1	46.4	41.5	64.4	
1910	58.4	47.9	41.9	65.8	
11	59.6	48.0	40.6	61.1	
12	63.7	52.7	38.9	62.1	
13	67.6	54.7	38.0	60.5	
14	72.4	56.9	36.1	61.4	
15	78.7	60.3	37.2	58.7	
16	82.4	65.8	35.0	56.5	
17	91.3	68.0	32.5	51.8	
18	109.0	68.9	31.1	49.0	
19	84.1	72.1	28.3	44.1	
1920	81.2	69.9	27.0	41.1	
21	80.3	69.7	34.3	38.4	
22	90.1	75.2	38.7	39.3	
23	89.6	76.9	31.0	37.5	
24	99.4	79.1	30.8	37.7	
25	101.2	80.0	30.1	36.5	
26	105.4	79.2	26.8	35.1	
27	103.4	76.8	24.5	33.2	
28	105.6	73.5	21.5	30.6	
29	104.9	72.6	20.5	31.6	
1930	112.1	66.6	22.3	31.1	
31	116.3		34.3	32.4	13
32	96.2		63.6	31.2	94
33	87.3		75.7	28.8	104
34	87.3		77.0	28.8	97
35	87.4		76.3	28.1	100
36	93.2		72.9	27.9	97
37	94.7		65.8	27.3	89
38	102.9		68.9	28.9	109
39	99.7		74.6	28.0	167
1940	100.9		77.2	27.0	194
41	101.1		70.3	26.3	178
42	95.8		54.9	25.0	132
43	99.2		40.0	23.6	85

TABLE I—(*continued*)

Calendar Year	Plug Cut	Scrap Chewing*	Granulated†	Long Cut	Cigarette Cut, Relatives‡
	million pounds				percent
44	87.9		31.3	20.7	58
45	107.1		39.8	21.6	71
46	69.7		19.2	17.5	87
47	66.4		20.0	18.3	86
48	66.6		21.7	19.3	84
49	66.0		23.2	18.9	89

* From 1931 forward, reported separately by B.I.R.
† Includes cigarette cut.
‡ 1935=100; Introduced in 1931.
For a brief description of the methods of making the estimates, see the statistical note, above.

TABLE II. ESTIMATES OF CONSUMPTION OF CONSUMER-MADE CIGARETTES AND ECONOMY-BRAND CIGARETTES

Calendar Year	Consumer-Made Cigarettes	Economy-Brand Cigarettes
	billion cigarettes	
1927	18.7	
28	17.2	
29	16.1	
1930	16.6	0.1
31	27.2	0.4
32	38.2	10.7
33	45.0	10.1
34	51.6	13.8
35	55.8	15.8
36	55.5	16.7
37	46.3	19.6
38	47.7	23.4
39	47.8	25.6
1940	50.6	22.4
41	39.1	24.0
42	34.0	18.7
43	30.8	13.0
44	22.7	9.5
45	37.6	11.5
46	13.8	3.0
47	14.9	2.8
48	17.5	3.5
49	18.0	3.5

The estimates of consumer-made cigarettes are rough. For the period 1933 through 1949, the B.I.R. supplied the writer with a special tabulation on a *calendar-year* basis of the revenue received from tax-paid packages of cigarette papers and the number of tax-free cigarette booklets. The number of tax-paid papers was obtained by using the tax-rate—1 cent for each 100 papers—and the total receipts supplied.

An estimate of tax-free papers used was derived by (1) assuming each reported booklet to contain 20 papers, and (2) assuming further that 20% of these papers were wasted. The estimate of consumer-made cigarettes is the sum of the tax-paid and tax-free papers just indicated. For the calendar years 1927–32, inclusive, it was necessary to adopt the same procedure for the available fiscal-year data for 1927–33. Calendar-year estimates from these fiscal-year estimates were obtained by averaging the fiscal years flanking the respective calendar year. The lack of any data concerning the quantity of tax-free papers of foreign origin prior to fiscal year 1927 makes it impossible to extend the estimates further back than 1927.

The estimates of economy brand cigarettes are: (a) For 1930–39, inclusive, sales of nine brands as shown in Defendant's Exhibit No. 1271 presented in evidence in the case, U. S. v. American Tobacco Et Al., during the trial in Lexington, Ky., in 1941. Sales before 1930 were very unimportant. (b) For 1940–49, the estimates of Mr. Harry M. Wooten published annually in *Printers' Ink*.

Wisconsin. Bakken's estimates were first published in a chart in a paper entitled "The Use of Wisconsin Leaf in Scrap Chewing Tobacco," *Economic Information for Wisconsin Farmers*, vol. 6, January 1935. Except for 1905, 1906, 1907, and 1916 through 1920, Bakken's estimates are in close agreement with those of Table I.

All data plotted in Figures 1 through 4 which are not included in Tables I and II are from the regular sources of tobacco statistics. There are occasional minor modifications of the published material. The guiding principle has been to select the material which best represents consumption by citizens of the United States. For example, the cigarette series for 1940 through 1949 is derived by deducting from the reported production figures the following: (a) exports (including shipments, except to Hawaii and Alaska); (b) lend-lease shipments; and (c) UNRRA shipments.

Sources in addition to those already cited which describe tobacco products more fully than was possible in this paper are:

(1) Bennett S. White, Jr., *Trends in Demand For Tobaccos of the Southern States*, Bulletin 431, Ky. Agric. Exp. Sta. June 1942.

(2) Henry H. Bakken, *The Marketing and Manufacturing of Wisconsin Stemming Tobacco*, Research Bulletin 162, Univ. of Wisc.; May 1949.

GOVERNMENT PROGRAMS IN TOBACCO

R. C. Austin
The Austin Company

OUTSIDE of public utilities, our government is probably as deeply involved in the tobacco industry as in any other business field. From soil to cigarette the government aids, abets, buys, sells, tobacco in a big business manner. Briefly, this paper is to point up some of the conflicts in this modelly close government-farmer-business cooperative.

This is not a criticism of that government involvement. Criticism of big government, or big business, or big labor is so much hogwash in a country as large as ours, when the criticism is based on bigness alone. This country grew up on bigness and on incentives to bigness. Goodness or badness from an economic and from a social welfare standpoint are the general criteria that must be brought to concreteness if criticism is to be of value.

Farmers, business men, government planners, and consumers who think the problems through start from a surprisingly simple and universally accepted group of aims in the U. S. tobacco field. These aims are stated well by two of our legislators.

First, from the humorous side. Congressman Gregory of Kentucky at a recent meeting of tobacco interests at Kentucky Lake arose for a few impromptu remarks at the meeting and said: "I think most of you will find I am a friend of all of you. In my efforts in national Congress I have always favored high prices for the farmers, good profits for the handlers and manufacturers, and low prices for the consumers." The applause he got was terrific.

In Senator Aiken's report to the 80th Congress on his farm bill he stated "the bill provides for a flexible price support program for agricultural commodities adjusted to the supply and designed to obtain fair prices for farm products and assure abundant production. It is the opinion of the committee that such a program will help stabilize the national economy while aiding the agricultural economy of this country."

Certainly no criticism of a program's aid can be made if it is to obtain a fair price for farm products and assure abundant production. Our troubles merely begin when we start defining this "fair price" and determining when a product is abundant and when it

is downright excessive or unpleasantly scarce. Nor will most people deny that it is a stimulant to the economy to give the farmer making substantial purchases of the goods and services which our economy offers. A difficulty appears here in ascertaining the cost of sustaining such purchases by subsidy.

Neither can we honestly criticize the tremendous over-all effort which our legislators have made to decide these values over the critical periods of depression, preparation for war, war, post-war readjustments, and defense preparations in which our farm program has taken form.

The criticisms to follow and the suggestions made for future action are those anyone can make on a review of the experience we have gained from past errors committed in the haste required by immediate action, in an economic system so complicated by economic factors which are still not entirely understood, and by social or political pressures which will never be entirely resolved.

Criticizing first, the government tobacco program is assailed on these counts:

(1) Frozen production patterns
(2) Loss of incentives under extensive controls and subsidies
(3) The costs of the program
(4) Confused marketing aims in raw product and finished product fields
(5) Loss of free market price as a production guide.

All of these are familiar to tobacco people and can be examined briefly.

I. *Frozen Production Patterns*

As presently administered, the parity support and acreage control type farm program we have has largely frozen and continues to freeze production patterns on an historical basis, rather than providing for any natural production shifts which would take place on the basis of comparative advantage of productive factors.

Although historical bases were the only practical starting point for production control programs, there is obviously no economic justification for freezing out the natural adjustment within and between areas which come from changes in efficiency of producing various controlled products. Individual farm, inter-area, and inter-country adjustments are affected, the latter still further than by the tariff barriers alone.

This problem presents itself in the tobacco program in the

difficulty of shifting acreages from tobaccos like the dark-fireds, for which markets are rapidly dwindling, to other tobaccos such as Burley or to other crops outside of the tobacco field. A similar and politically potent problem is arising in flue-cured areas where Old Belt tobaccos have proven less desirable to modern consumers than thinner tobaccos to the South. Between types the problem may be solved by the mechanics of the supply formulas on which total acreage allotments are based, but within types the over-all supply formulas and acreage allotments are helpless.

On the individual farm the efficient producer cannot increase his acreage even if he were willing to do so without government support, for he is penalized the value of a large part of his crop returns if he does so. Capitalization of tobacco allotments into land values as vested interest is common in every farm sale advertisement in the tobacco areas in recent years. Described by some, such as Agricultural Committeeman Hope, as a giant monopoly, the acreage control program is so buffeted by political implications that there can be left little flexibility in its operation. Provision for the effects of changes in demand and consumer taste for some qualities within a commodity is neglected with over-all treatment of a commodity which may have many different qualities and characteristics according to the growing region.

This is not to conclude that this method of procedure was stupid and can be easily changed in legislative process. One can imagine the Congressional uproar if the South Carolina delegates claimed the Old Belt tobaccos should be cut down in acreage, even though such an allegation might be quite true.

II. *Frozen Opportunities*

Our acreage control allotments do definitely mean that the opportunity of the individual farmer to raise what he believes best and most profitable for his farm, and his freedom to change from one farm crop plan to another are limited. However, few of us place such value on freedom in economic affairs that we place its importance above a sufficiency of economic necessities to afford us that more important freedom to live comfortably and to be able to give our families the things which we think our efforts should afford. There is no use to talk freedom to a man in any effort to earn a livelihood when such freedom merely means freedom to do what you please but to starve while doing it.

While our congressional formulas and planning boards in agriculture may know best what total amounts of various farm products our country will need in a coming year, the individual farmer knows pretty well what he wants to produce and can produce on his own farm with the resources he has. If acreage controls disrupt these farm plans to the point where the national loss is greater than the gain, it is the common failure of our enthusiasm in paternalistic planning to conclude that we know best, and the individual doer's initiative and intelligence must be limited in its freedom of action to that extent. It is not always that the conclusions of a few great brains are better than the conclusions of multitudes of smaller intellects. Perhaps there is a field for both, and continued stifling of the individual initiative can lose one of the basic elements of strength in our economy.

III. *The Costs of the Program*

Politically the first cost of the parity programs for farm commodities brought forth for argument are the Agricultural appropriations as a whole. Without relating them to the services provided this is pure political demagogery. In the fiscal year ending June 30, 1949, CCC President Ralph S. Trigg announced the net realized loss for the year as 254 million dollars. On November 30th of that year the CCC had $3,370,190,000 invested in program loans and inventories.

These figures offer a superficial approach, which may be controversial but which is not too profound. The judgment of cost we must arrive at is the valuation of (1) the loss in total revenue to agriculture sustained by acreage reductions under the program, if any; (2) the loss in future revenue to agriculture by the encouragement given to competitive farming in other countries by the higher prices of U. S. products under subsidy; (3) the costs of the other government functions required in the program but not paid for in CCC accounting, and (4) the loss in real income to the general consuming public through the higher prices of the farm products which they consume resulting from parity program activity.

Balanced against these costs are placed: (a) the increase in total farm income, if any; (b) the gains in farm fertility and farm efficiency through the important conservation work tied in with the acreage control work; and (c) the gains to the economy of the

pump priming spending and increased farmer purchases resulting from the parity program expenditures.

These are not items which we can concretely record for comparison, but we do recognize that in a product for which there is an inelastic demand, to a point the total revenue to the producer will increase as excess supplies in the market are reduced by production cost or CCC purchases. Nevertheless, our eagerness to see the farm revenue maximized must not overcome the deliberate consideration needed to potential loss of markets nor the cold fact that maximization of revenue for any monopoly whose members, however numerous, fall short of our total population is not the same as maximization of real income levels for the total population. Nor must our business acumen allow us to permit farm production to reach uncontrolled excesses in an all-out drive for lower prices to consumers.

Most of us in this country are in favor of profitable returns to every entrepreneur who is performing at his best services which he can provide and which are needed by other consumers. Most of us realize that government spending can relieve persons suffering from standards of living lowered by a national depression or an industrial one. Finding the middle road between excessive returns to monopoly or vested interest (whether private or public) and a fair return, and between pump priming when actually needed and government spending for political expediency is the difficult task.

IV. *Confusion of Marketing Aims*

Probably the main criticism of the American soldier was the enthusiasm with which he proceeded with his given job, whether he was given the final goals toward which he should work or not. He tended to do something regardless, usually displaying an enthusiasm which occasionally manufactured some goals to give the job more importance or meaning. In the flurry of growth of government in the past fifteen years, this same enthusiasm has led some bureaus and individuals to expand their interpretation of legislation to increase the importance of their jobs and to justify their government posts without adequate Congressional or executive goals to guide them.

In the marketing of tobacco and tobacco products this confusion of aims has created more friction and uncertainty than the major objectives of parity, acreage control, and soil conservation, which

find surprisingly universal approval despite their many political facets. The normal formation of markets to serve producers and buyers in tobacco has been thrown into a turmoil of over-expansion and lack of cooperative control by reason of court decisions and inability of the Department of Agriculture to hold to clear policies under political pressure.

We are gradually accepting the idea of balancing economic powers which cannot reasonably be divided to a point of atomistic competition. We have not stated these new principles so that they can be bases for court decision, or guides for administrative action, or even concrete economic or social precepts which lend themselves to clear legislation. This is a challenge to students in the economic field whose solution will decide if it is possible to have a state which retains the incentives making use of the enthusiasm of initiative while raising all minimum real income levels; or will see the necessity of dropping them for the slower and somewhat less exacting progress of a government state.

V. *The Loss of Free Market Price as a Production Guide*

A final field for error in our present farm program is that realm of the unknown which we enter when a commodity price is removed partially or wholly from market determination, which is in some sense the infallible judge of what the people, the consumers, want produced in this country. We can establish artificially higher price levels for a commodity by price support, but the moment we do so we cut loose from the only sure guide to what the demand schedule for a product is—the free market.

Despite the multitude of efforts at definition, we do not yet have a way to establish a production cost for a commodity in agriculture to use as a pricing step. Nor do we have the socially acceptable or desirable rate of return of profit to add on to this price, were the cost of production known. There seems to be a difference of opinion between the Committee for Industrial Organization and the National Manufacturers Association on this subject.

The Committee on Agriculture for the two Houses of Congress seems to feel that this price, which gives the farmer cost of production plus the socially acceptable and just profit to him, is somewhere between 75 and 90 percent of parity. The 1948 Congress felt it was between 60 and 80 percent. The Tobacco Bloc insisted that it was 90 percent.

These are wide limits. The answer will be more definite in the future. If it is not, we face contradictory decisions in which we may be guaranteeing every one greater shares than the division of the whole will give, leaving the one escape hatch open of inflation.

At that point, the only return to what the people really want to consume, and are willing and able to pay the costs necessary to get, will be through allowing a market price determined by the meeting of supply and demand, which are free enough to be an expression of demand supply schedules and not a point on one schedule crossed by a line on the other, or vice versa.

Enough of criticism. What goals can we suggest that might be useful in these problems?

(1) The first goal is a trite one. Easy to state, hard to perform. The first goal of our program must be to call forth production and qualities of tobacco which *would* under the ideal conditions of perfect competition find effective consumer demand at prices profitable to farmers.

This is simply an economic statement that the socially acceptable balance of income position between the farmer and the rest of our population must be struck at the maximum levels of production of commodities rather than any lower levels. To arrive at these desirable maximum production balances we must have economic tools of analysis which are understandable for the layman and the legislator, tools which work with the realities of our complicated mixture of partial competition, monopoly, government control, and the intermediate degrees.

If these tools are not offered we can expect a continued groping of public and politic at the fetishes of slogans and promises which may or may not serve the purposes desired in freedom, security, and rising standards of income. To the extent that some of these goals desired are incompatible, the clear reasons that they are must be brought out by students of the economic system.

(2) A second necessity to our program to provide for long term abundant production and acceptable income in tobacco arises from the inelastic demand schedule for tobacco. This inelastic demand must be supplemented by commodity purchases and sales of raw tobacco where demand shifts beyond the control of the producer cause immediate crises of excess or under supply in relation to the relatively inelastic demand.

Whether we have government purchases, purchases by farmer

associations, or by private trade, the risk factor involved in supply and demand changes in tobacco beyond human error in the judgment of future business is too great for private financing at levels which would maintain farmer returns above his costs in critical years.

This does not mean that we must guarantee every farmer a profit in every year, nor that we must protect the industry from natural business risks. It does mean that we have progressed far enough in our understanding of economics to know that commodities in inelastic demand are so sensitive price-wise to supply changes that the cost of allowing these price changes to fluctuate wildly is greater to the economy than the costs of public financing of efforts counteracting these fluctuations. Further in the field of international trade and politics, there have developed and continued so many artificial barriers to trade that they now occupy a risk position greater than business can finance, without a similar loss to the economy which would outweigh the costs of public financing of security against these risks.

Whether government operation of these programs may develop a bureaucracy of vested interests which will jeopardize the normal business operations which take place outside of these greater risks is uncertain. Whether a method of low interest public financing of private assumption of these risks would be more economical is equally uncertain. The farmer associations now operating under the CCC are doing a most creditable job, and of themselves, cannot be accused of excessive cost to the economy or of destruction of the normal business operations of private trade.

The associations are an acceptable workable device for assuming these critical risks and have to date had a stabilizing effect in tobacco marketing, which has increased with trade confidence in them. The trade as a whole feels they should be maintained.

(3) A third aim, which is restating some of our criticisms, is to operate government commodity control programs in the national interest, in avoidance of vested and monopolistic interest development which destroy the production and efficiency incentives of independent farm and industry entrepreneurs; and to avoid freezing production patterns against natural progress trends.

The great temptation with a price subsidy program in a commodity like tobacco is overcoming the same monopolistic tendency to maximize income for those who have tobacco allotments, making

the most of acreage controls to benefit those who now have a production quota without regard to national optimums. The time is short for a tobacco farmer with an acreage allotment to see the possibilities for gain to himself in maintaining limited production and especially preventing shifts in production to other areas which might be more efficient. The congressional pressure of organized groups who have a vested interest is well known compared to the vague desires of a national consuming public for the lowest prices possible with reasonable returns for long range continuance of high production.

To maintain a farm production which is adjusting itself to an optimum pattern of efficiency, acreage quotas must be adjusted not only between areas, but between farms, and between farmers, and between crops. This is not a job for a day, but does offer the greatest challenge to progress in the entire acreage program.

Local AAA committees cannot be expected to make these adjustments, even between farms and farmers in their community—the pressure on them is too great and the information which they have on hand is too meager to make such decisions. This paper contends that such adjustments must come (1st) through interarea adjustments based on more finely analyzed surplus relations between those areas, and (2nd) through price supports flexible enough to allow the elimination over time of those farmers who are not efficient enough to produce at a cost which effective consumer demand for that product, outside of all subsidies, will sustain, and (3rd) through penalties for overproduction which will in some manner allow the better farmer or better area to increase or begin new output.

These adjustments are going to be painful. High industrial production and job opportunities outside of the commodity concerned will aid them most. Worship of the 'family farm' should not close our eyes to the necessity of such adjustments. We cannot continue to subsidize production at prices which deter the progress made through increased production effort by the efficient and shift of the inefficient to alternative lines.

(4) A fourth aim is the one with which we are all familiar, that is the rather unattainable ideal of reviewing tariff policy from a national rather than from a pressure group or individual industry standpoint.

All the arguments for and against are familiar, but a forward and encouraging outlook against protectionism is evidenced in recent

government proposals to facilitate the movement of productive forces out of lines we could buy more cheaply in other countries. One of the long run hopes for increased tobacco allotment to exploit the taste preferences abroad for our tobaccos, is in the lowering of tariff walls here and in other countries sufficiently to encourage the international development of those industries in a country in which it excels.

(5) A fifth aim is that of removing unnecessary artificialities of government control in tobacco marketing. This would be aided by support of committees made up of all sections of the tobacco trade and by clarifying government aims.

The chaotic condition of increasing already overexpanded marketing facilities is a direct result of Departments of Agriculture and Justice policies. The Department of Agriculture policy in market location is to place government graders in all markets which open to sell tobacco regardless of the need for these markets or conditions in the market area. This action has been the result of political pressure on the Department by local groups and the anomalous situation that major groups in the industry, especially the manufacturers, are afraid to attend a trade conference which even discusses the problem for fear of anti-trust prosecution.

This same fear of prosecution has led some companies to enter all new markets regardless of need, and to create such an uncertain line of permissible activities to the domestic buying companies that they are afraid to attend even the most open meeting on market practice improvement.

The Congress, not the Courts, should definitely state the legality of open trade conferences where all elements are represented to decide such mutual problems as market opening dates, new market openings, and market practices. The alternative is the chaotic confusion of today in overexpansion.

The Department of Agriculture should sit in on the marketing practices conferences, but the decisions should derive largely from the farmers, warehousemen, buyers, manufacturers. The Department must lose some of its fear of Congressional reproach and offer some help in making reasonable their fellow officials in the Department of Justice if this is to be done. The tobacco trade will in turn have to offer public support of Department action. A solution of the excess market expansion would be a simple formula for making government grading services available for geographic production areas in a ratio of one grade per 4,000 acres of tobacco allotment

or the like. The important thing is to stop economic waste which results from indecisive or impractical government action.

(6) While speaking of the Department of Justice, we come to a sixth aim: To provide under anti-trust legislation a realistically competitive field in marketing of raw tobacco and finished products.

With the trip to the ideals of atomistic and perfect competition impossible under our present industrial and marketing structure, the alternative is to balance monopolistic or oligopolistic powers and point them toward the public good by clearly set out legislation showing what actions are in the public interest and allowable on one hand and the contrary on the other. The courts are boxing with their shadows when they search for the existence of monopoly power, which has been with us ever since private trade marks, patents, national advertising, and the economies of large scale production and distribution. Our human preferences make such monopoly power present in some degree in every business situation or buyer and seller relationship.

The important thing in anti-trust legislation is that all business existence of monopoly power be guided in the public interest to the degree practicable and prosecuted effectively and clearly the moment public interests are damaged. For this to occur, the Department of Justice and the Supreme Court must be properly oriented either with a clarification of the terms of our present legislation or given additional laws which tell courts, producers, and consumers what is and is not in the public interest. It seems in some measure ridiculous that prosecution is brought against the A & P grocery chain which brought low cost food retailing to most small towns in the country, but it is encouraging and helpful to bring to the public the foolish lack of public interest goals or aims in use by our judicial guards.

The realistic approach must be one similar to that taken in raw tobacco marketing where the weaker bargaining agent, in this instance the tobacco farmer, is brought into balance by strength of cooperative action such as the acreage controls, the surplus purchases, and sales programs. However, the equally dangerous pitfall of restricting production to the point that the loss to the consumer exceeds the gain to the farmer must be avoided. The balances of power offered must be those which bring production and consumption toward the maximums which perfect competition would have offered, not toward a satisfied but lower level.

Similarly in the wholesale and retail price field, definitive government action must see that lower costs are passed on to consumers without undue delay and that these lower costs be an expression of competitive pricing as well as competitive advertising.

(7) The seventh aim is another economist's "only." That is, the decision whether the excise method of taxation which rests heavily on tobacco products is that desired by the whole economy. It is the familiar question of which is the more important, painless taxation or maximizing real income by removing the artificial limit to consumer choice—a matter which is not for discussion here.

(8 and finally) The aim in parity formulas must be to constantly reappraise them and their historical bases, remembering that there is no magic in formulas to provide the best growth in farmer and consumer real income levels. They are no more than workable substitutes for our inability to define cost of production and nationally acceptable rates of return to the satisfaction of political, economic, and social requirements in an economy in which each individual is fortunately quite different.

We know that the parity formulas as now conceived can grow far from a satisfactory adjustment in the national viewpoint and would tend to do so from tobacco Congressional pressures were the public not on guard.

The time may come when we can adjust the price relatives established by parity concepts with more accurate data which will allow the increased efficiencies of one part or another of farm production to express its efficiency in lower prices to consumer, the only method of reaching the entire nation with the fruits of progress without burdensome government.

The Outlook

What is the future outlook for the farm program in tobacco? Since the disastrous conditions of the early 1930's which climaxed a long period of general farm depression, the new attitude of our governmental economic policy has had a hard row to hoe in striving to prescribe an Agricultural Adjustment Act to solve farm problems on a short and long range basis. There are those who believe that individual area and crop interests under our present governmental procedure of planning and writing a farm bill cannot produce a satisfactory one for the economy as a whole under such diverse pressures. This seems overly pessimistic in view of the tremendous improvement in farm income positions, the rising stand-

ards of living and nutritional advancement, and the general improvement of the face of our agricultural resources under improved conservation and farming practices. We are only beginning to feel the basic improvements which the most excellent portion of our farm program—the state and federal extension and education work—is providing. Farm people, like the rest of us, are slow to change their practices, but a glance at the farmland in most sections of the country compared to twenty or even fifteen years ago is eloquent evidence that progress has been made. To be certain, inequities have arisen; some farmers in the potato section may have grown rich while others in neglected areas or crops have made slow gains. No program of the size and speed with which enactments had to be made can be expected to offer an individualization or supervision to the point of freedom even from gross errors.

We are lucky to be in the only great power country in the world which is making an effort to operate an economy on a basis that will continue to harness the super source of growth—millions of individual thinking, planning, acting units operating under individual incentives. Our closest neighbor, Britain, has acknowledged her failure to grow under the individual incentive system and has compromised for security with nationalization at lower production levels. Our taxes and controls may be greater than ever before, but so are our profit incentives and standards of living. We look at the government program for tobacco in this light—that it is intended to aid and will aid the industry in all its segments, not to nationalize it.

For encouragement we must walk out and look at the fence rows, the paint on the farm homestead, the faces of the people on our farms. Or at the factories and the circle of workers, cars and homes which surround them. Or at the price and quality of the final retail product compared with any others in the world. Our production for export is large enough to challenge our ability to pick out enough goods for a return payment. However difficult the problems are, the outlook in this picture is most hopeful, and should become increasingly so with our increase in knowledge, experience, and tolerance in dealing with these problems.

SOME ASPECTS OF RESEARCH IN THE MARKETING OF TOBACCO LEAF*

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I

THE aim of almost all research in marketing can be expressed in terms of increasing marketing efficiency. This problem can be better understood by separating efficiency into two distinct but interrelated components: (1) pricing efficiency and (2) operational efficiency. It would appear to be useful to show in a general way the distinction between pricing efficiency and operational efficiency.

"The marketing system for farm products serves two broad purposes: (1) through assembly, processing, transporting, storing, distributing, and similar operations to add form, time, and place utilities to the raw farm products in moving them from farm to consumer; (2) through the various mechanisms of exchange to allocate these commodities among buyers, and the returns for them among sellers, and thereby to give expression to consumer preferences as guides to the use of productive resources in both primary production and marketing itself. The 'efficiency' of the marketing system—and of its segments—must ultimately be evaluated in terms of effectiveness with which these purposes are served: the relationship between the consumption utility created and the resources used in its creation.

"The problem is twofold. Within agriculture itself we desire that the system promote maximum output of consumption utility in relation to the input of resources in production and marketing. As part of the whole economy, we desire that it contribute to an over-all allocation of resources, especially between agriculture and other industries, that will maximize utility output, over time, from use of the resources available to the economy."[1]

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† The author wishes to acknowledge his indebtedness to H. B. James, W. W. McPherson, and W. H. Pierce for helpful suggestions.

[1] Report of Work Group I, *Input-Output Relationships in Agricultural Marketing*, Second Annual National Marketing Workshop, Purdue University, July 1950 (Mimeographed), p. 1. This formulation does not explicitly take account of both the existent and the potential cost functions; a disparity between the two might persist if elements of monopoly were present. For a more complete discussion of the functions of an economic system see George J. Stigler, *The Theory of Price* (New York, 1947), Chapter 3.

It seems clear that pricing efficiency and operational efficiency must be analyzed simultaneously. For example, the amount of physical handling necessary in the marketing of tobacco leaf is interdependent with the nature of the marketing system which is itself determined by the criterion that, except where indivisibilities and discontinuities make it impossible, specific resources will be applied to tobacco marketing until the marginal efficiency of the last unit of each specific resource applied in tobacco marketing is approximately equal to its marginal efficiency in other uses.[2]

II

A brief, simplified statement of the conditions under which the production and marketing of flue-cured tobacco leaf[3] are undertaken, and the processes and activities involved, will perhaps make the problems in marketing easier to understand.[4]

Among the major crops in the United States, tobacco production employs the greatest amount of labor relative to land per unit of output. Approximately 480 hours of man labor are combined with an acre of land to produce 1,229 pounds of tobacco leaf.[5] The process of production consists of preparation and care of plant beds; preparation of land; transplanting from beds; cultivation; topping, suckering, and insect control;[6] barning[7] and curing; sorting, grading, and tying into hands. Few of these activities have been adapted to mechanical performance; during the period of critical labor needs

[2] Of course it is assumed that the specific resources allotted are combined in such a way as to yield a maximum quantity of the marketing service. What is meant here and above is the performance of the second function discussed in Stigler. See Stigler, *op. cit.*, p. 33 ff. Here again our statement has ignored the possibility of the existence of monopoly, and its effect upon the determination of the optimum scale.

[3] Most of what is written here is meant to be specifically applicable to flue-cured leaf; burley leaf is marketed in a similar manner, and marketing problems appear to be quite similar. Cigar-leaf tobaccos are marketed quite differently, while Maryland tobacco is marketed in a somewhat different manner.

[4] This section owes much to the suggestions of W. H. Pierce.

[5] Erling Hole, *Practices and Costs in the Production of Tobacco*, Bureau of Agricultural Economics, U. S. Department of Agriculture, April 1950, p. 2.

[6] "Topping" is the process of breaking the flowering part of the stalk at the height that will leave the desired number of leaves to grow to maturity. After being topped, off-shoots or suckers appear at the base of each leaf and must be removed every week to ten days.

[7] "Barning" involves a number of operations. The leaves are pulled from the stalk (priming) as they mature (ripen), usually at intervals of about one week depending upon weather conditions. The leaves are then tied on sticks (stringing) in bundles of two to three leaves through a process of looping cord over the leaf stem alternating from side to side in attaching the bundles to the stick. The tobacco is then hung in the curing barn in tiers, and subjected to varying degrees of heat to dry the leaf and stem.

(from priming on) they have not so far been found adaptable to labor-saving or mechanical devices.

From this point on in the process, the tobacco is transported to an auction warehouse where it is unloaded and placed carefully in flat baskets, usually with the aid of warehouse employees. There is a maximum of 300 pounds per basket of tobacco leaf. The baskets are trundled to assigned places on the floor. A government grader comes through the rows before the sale, and assigns a grade, based on the government grading standards, to each basket of tobacco. At the appointed time, a warehouse representative, the auctioneer, buyers representing the tobacco companies and the independent leaf dealers, a variable number of speculators, and clerical employees of the warehouse who record the data on the sale, troop down the rows as the sale proceeds at a rate of about 300 baskets per hour.

When a particular basket has been sold, the farmer has a very short time within which he may reject the sale by "turning the ticket." If the sale stands, employees of the buying company wheel the tobacco leaf onto a flat-bottom truck, and it is taken to the nearest redrying plant belonging to (or under contract to) that company. Then the redried tobacco is packed in hogsheads for storage and ageing. After varying periods in storage, the leaf is manufactured into cigarettes, or pipe tobacco, or some other tobacco product.

III

Even from such an inadequate description as that outlined in the section above, several questions immediately come to mind. For example, why is all the time-consuming and labor-using movement between the farm and the redrying plant necessary? Why could not the leaf be transported directly from the farm to the redrying plant? These questions appear to concern the matter of operational efficiency. Undoubtedly the justification would be that this expenditure of energy is necessary in order to get the leaf priced and distributed among the firms engaged in processing and moving tobacco products to consumers. With the present state of our knowledge about tobacco marketing, it appears to be impossible to say whether or not the pricing system is completely satisfactory, considering its cost. One of the criticisms often leveled at the pricing mechanism is that prices for what purports to be the same grade

of tobacco vary considerably even on the same warehouse floor on the same day (and for the same company).[8] It must be pointed out, however, that price uniformity is not a universally valid indication of pricing efficiency. The pricing system should bring forth identical or nearly-identical prices for essentially the *same* quality of product in the *same* use. In milk marketing, for example, it is now common to find that milk produced under like sanitary conditions (this supposedly is one very important indirect measure of quality in milk) will have different producer prices applied according to whether the milk goes to the consumer in the form of bottled fluid milk, cream, ice cream, cheese, etc. This form of price discrimination has been legalized. It is not at all unreasonable to suppose that the same quality of tobacco might be usable in the manufacture of standard cigarettes, economy-price cigarettes, pipe tobacco, and perhaps other uses. Thus it should occasion no surprise to find that one grade of tobacco would bring one price when bought for standard cigarettes, another when bought for economy cigarettes, still another when bought for pipe tobacco, and so on.[9] But one might anticipate a certain degree of multimodality in the frequency distribution of prices of baskets of a particular grade of tobacco. The reader can fill in mentally the other assumptions which would be necessary before our multimodality would materialize even in an economic model.

It can be seen that any effort to judge the operational or pricing efficiency of the marketing system depends upon a rational solution of this probem of price determination. One approach which suggests itself is to put out of our minds all that exists in the marketing between farmer and the manufacturer of tobacco products. We have the tobacco standing in the field unharvested; the manufacturer needs certain quantities of tobacco with certain characteristics. What is the most economical way to bridge this gap physically with the additional requirement of pricing the leaf so that the qualities and quantities required will be forthcoming from suppliers, and so that the resources used in production and market-

[8] For a study describing the variations on one market in 1938, see S. L. Clement, *Variations in Flue-Cured Tobacco Prices*, N. C. Agricultural Experiment Station Technical Bulletin No. 69, Raleigh, N. C., May 1942.

[9] It might also be reasonable to expect a particular grade to bring a price consistent with the marginal revenue to be anticipated from the use of that tobacco (or a higher than marginal revenue in the case of the presence of oligopoly, or a blend price based upon the marginal revenue from several uses).

ing will result in the maximum amount of consumer utility? We have one problem yet to perplex us. Do we know what prices should be attached to the tobacco leaf when it reaches the manufacturer?[10]

The manufacturing companies do know that, by following in their buying and blending what they have done in the past, they can produce a cigarette (for example) which with a certain amount of advertising they can sell at a profitable price. Whether the companies know within what range of measurable characteristics[11] their blend must lie in order to be accepted in the desired manner by consumers is not public knowledge. And if we could assume complete knowledge on this aspect, we also do not know whether the buying companies have experimented enough to know all the combinations of classes of tobacco,[12] grades, and so forth which would give a blend within the desired range.

If we had this information along with data on the resources required on the supply side for various combinations of qualities and quantities of tobacco leaf (and of course with some variability allowed in the marketing services provided), we could arrive at some approximate prices for tobacco leaf delivered into the hands of the users.[13]

The writer can only guess at the size of the gap between the amount of information in the hands of the tobacco companies (and being used) and the amount necessary for perfect rationality. Two comments may be made.

First, regardless of the size of the gap, we can anticipate that it will be narrowed. Contribution can be made by encouraging re-

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[10] There is always the problem arising out of the fact that in an economic system all the variables are determined simultaneously. Thus it is impossible to know exactly what the price at this stage would be unless we know what services and what manner of pricing mechanism must be included in the supply curve—and this is precisely our problem.

[11] Such as percentage of nitrogen, nicotine, and reducing sugars in the tobacco, to mention only three chemical characteristics believed to be associated with the quality of tobacco product or of tobacco leaf.

[12] The Tobacco Branch distinguishes flue-cured, fire-cured, air-cured, cigar-filler, cigar-binder, cigar-wrapper, and miscellaneous types as classes. Used for cigarettes are all five types of flue-cured tobacco, and two of the five types of air-cured. In addition one foreign type (called Turkish) is usually included in cigarette blends.

[13] The technique for such determinations could probably be developed from the foundations outlined for "Linear Programming" by Marshall K. Wood and George B. Dantzig. See Wood and Dantzig, "Programming of Interdependent Activities: I. General Discussion," *Econometrica*, July-October, 1949, pp. 193–199, and Dantzig, "Programming of Interdependent Activities: II. Mathematical Model," *Econometrica*, July-October, 1949, pp. 200–211.

search in the natural sciences which will help shed light on the dark corners indicated. Continuing research in the social sciences can contribute to maintenance of economic and other knowledge in such a state of readiness that new developments in either the natural or social sciences can be incorporated in the marketing system.

Secondly, if the tobacco companies do have enough information to act with a high degree of rationality, then we are justified in using the values placed on the leaf as satisfactory, and proceed to set up a synthetic model to bridge the gap between farm and tobacco company in the most economical manner.

IV

Because it may be assumed that the tobacco companies do operate with a high degree of rationality, we may ask ourselves, what can be done to reduce the quantity of resources necessary to place tobacco leaf into the hands of using firms? One reason for a great deal of the physical handling and some of the financing is the apparent necessity for the tobacco leaf to be exhibited before a representative of each buying firm. The necessity for this rests at least in part on the fact that each buying firm has developed a grading system independent of that used by any other firm or that devised by the U. S. Department of Agriculture.[14]

A great deal of confusion could be cleared away and some of the obstacles to an objective appraisal of the marketing system removed, if a grading system could be developed that would be satisfactory to all participants in the tobacco industry. There do not appear to be any formidable logical barriers, although the practical difficulties are plentiful.

Three possible phases could be distinguished in this problem. Research could make a contribution to all three. They are:

(1) demonstration of the feasibility of a universal grading system;
(2) development of the system; and
(3) securing adoption of the system.

The first is the phase being attacked currently. Its completion depends primarily upon demonstration that a universal grading system is feasible and workable. Those to whom the demonstration

[14] On any market where there n buyers there would be $n+1$ grading systems in use.

must be particularly convincing are the managers of the buying firms and of the government agencies. The amount of effort necessary to convince these managements depends entirely on their attitudes; in an extreme case, even the development of a satisfactory system might not be convincing enough to elicit adoption by the aforementioned managements.

Cooperation of these managements is important—there can be no question that phase (2) can be completed more easily with the full cooperation of the buying firms. It may be impossible at the present time to develop a universal grading system without the cooperation of the buying firms. Further, even if a satisfactory system could be developed without it, a good deal of doubt must arise in connection with whether we could get the system adopted unless the buying firms (or a majority of them) had cooperated in developing it.

V

What after all are the criteria which a grading system is supposed to satisfy? Simply and fundamentally, a grade is supposed to reflect product substitutability in use and/or different uses of perfect substitutes. What then are the problems in demonstrating the feasibility of a universal grading system, and in developing such a system?

A brief look at the grading systems in use will help to establish a basis for understanding the problem. Because the system developed and used by the U. S. Department of Agriculture was established on an objective and known description of the tobacco leaf, this system probably constitutes the best starting point. For flue-cured tobacco, the government grade assigned depends upon four factors: (1) group, (2) numerical quality designation,[15] (3) color, and (4) special factors. The group symbol designates the stalk position; the principal stalk positions (coming down from the top to the bottom of the stalk) are Leaf (L), Smoking Leaf (H), Cutters (C), Lugs (X), and Priming (P); Wrappers (A) are unusually fine tobacco coming from the upper part of the stalk while Nondescript (N) is rather poor-looking tobacco that may have come from any part

[15] This numerical quality designation is based upon such attributes of the leaf as thickness, length of leaf, breadth of leaf, pliability, texture, condition, wholeness of the leaf, among others; it is believed that most graders select an entire grade rather than selecting its components one at a time.

of the stalk. There are six numerical quality designations, denoted by a number in the second position. Only qualities 1, 2, and 3 are recognized for wrappers; 6 is not used for cutters or lugs; 1 is not used for primings, while only 1 and 2 are used for nondescript. The third position in the grade is the color designation with Lemon (L), Orange (F), Red (R), Dark Red (D), and Green (G).

Most grades consist of only three symbols. Sometimes a fourth symbol, representing a special factor, is added as a suffix to the three already determined. V shows a greenish tinge, K denotes off-color or variegated leaf, M mixed, W doubtful keeping order, U unsound or damaged (under 20 percent), and G in the third position followed by L, F, or R in the fourth indicates that the color is Lemon, Orange or Red, but that some green can be distinguished (more, for example, than if the designation were LV, FV, or RV).

In a sample of the tobacco sold on the Wilson market in 1948, 142 grades were noted. Seventy-seven grades were designated by only three symbols, 65 by four.[16]

There are three leading firms buying tobacco leaf for use in the manufacture of cigarettes sold in this country, two principal firms that buy for export to corporate affiliates engaged in the manufacture of tobacco products, and many independent leaf dealers. These dealers buy on their own account, redry and store the leaf, and sell to users in this country or abroad who are not large enough to, or who for other reasons do not, maintain their own buying corps. Each domestic manufacturer, each buyer for export, and, as far as is known, each independent leaf dealer has a grading system which is independent of that used by any other buying firm. One of the companies buying for export and most of the independent leaf dealers appear to have a grading system for each affiliate (in the case of the buyer for export) or for each firm with which they have a continuing relationship as a buying agent. Obviously, a firm might have a grading system which duplicated itself a dozen times. One export company used 92 grades on a single market (Farmville, N. C.) during the marketing season of 1938–39; the three domestic companies used 16, 15, and 39 grades while the other export company used 35.

What accounts for the disparity in the number of grades? One possible explanation is that 12 to 18 grades may be required for the tobacco leaf used for cigarettes, while something on the order

[16] Four-symbol grades are usually called sub-grades by the Tobacco Branch.

of 18 to 24 grades may be required for other uses (pipe and smoking tobacco, chewing tobacco, and snuff, for example).[17]

What would be the procedure for going from the multiplicity of grading systems we have now to a single one? We could use the U. S. Department of Agriculture grading system as a common denominator and study the relationship between government grades and company grades. Appendix A shows a contingency table for the purchases of one company on the Farmville market during the 1938–39 marketing season.[18] We could reinforce this by studying the prices assigned to these company and government grades by company buyers.

Several comments may be made about these data. First of all, the position on the stalk does not appear to be a significant factor in the grade placed on the pile of tobacco by this company; leaf from each stalk position (A, H, C, X and P) is placed in each of seven major grades. Likewise the contribution of color as a determinant of company grade does not appear to be substantial. There does appear to be a significant correlation between the company grade and the numerical quality symbol used in the government grading system.[19]

[17] It is not immediately clear whether this number of grades would really be required; the companies may have one grade for a quality of tobacco leaf to be used in cigarettes, another grade for the same quality to be used in a lower use. An ideal grading system would describe two identical lots of tobacco by means of the same grade whether they be priced differently because of a different use, or not.

[18] There is one very important point to be made about this table and others like it. Both government and company graders make errors in the grades they assign to given lots of tobacco. If each company grading system were based upon a set of objective standards, then contingency tables like the one referred to would be only an approximation to the relationships which actually exist between company and government grades. The difference between this table and one showing the actual relationships arises largely from grading errors. There is also the possibility of having so many grades in a grading system that there is more variation in the objective characteristics within grades than there is between grades. Actually, no method for obtaining error functions for company or government grading systems has been developed; it seems very unlikely that the error functions for the government grading system and for any company system are very similar.

[19] The implications of these apparent relationships are far from clear. It is possible that having the tobacco sorted into stalk positions and color is more of a facility to the company buyers than appears from a study of contingency tables. That is to say, it may be that the quality designations of the companies cannot be applied until the stalk position is known; the quality criteria may well be different for each stalk position.

There is also the possibility that company buyers do what we might call "floor blending."

Even if "floor blending" isn't practiced by the buyers, it is possible that what we might call the compatibility of qualities of tobacco leaf for the purposes of packing together in hogsheads is based directly upon stalk position even if the grade and price are not. In each of the last two cases, the value of the indication of stalk position would be greater than might at first appear.

Another reason for beginning with the government grading system is to avoid the distorting effects of "price-grading." This practice consists in the application by the company of a grade which is more closely related to the price paid than to any objective standards of quality.[20] If the standards for a company grade are sufficiently wide and overlap each other, then there might be some reason to expect this phenomenon, particularly if the individual buyers are operating under rather definite price and quantity instructions.

VI

If we have established a reasonably good case for commencing with the government grading system in our effort to demonstrate the feasibility of a universal grading system, and to develop it, then it is well to inquire what procedure may be suitable and available to us. It is also worthwhile to inquire whether any "development" of the present government grading system is required—would not the present system be satisfactory? It probably would.[21] The number of grades, however, is fairly large, and if as satisfactory a system could be devised with fewer grades, one which did not enhance the expensiveness of the marketing process, then the case for developing such a system would be clear-cut.

A beginning might be made by seeing whether any government grades currently being used could be dispensed with; more exactly we can attempt to determine whether the tobacco placed in specific grades established by the government is graded and purchased by companies in such a manner as to indicate that separate treatment is really necessary for that particular quality of tobacco.

We could, for example, commence with one of the special factors

[20] The sequence of operations at this stage is consistent with this hypothesis. The auctioneer sells each pile of tobacco to the highest bidder; after the buyer and price have been determined, the buyer turns to the "clipman" (who is recording for the warehouse the pertinent information on the sale), and tells him which company grade is to be affixed to the pile of tobacco. Thus price is always known before the company grade.

[21] The Flue-Cured Tobacco Cooperative Stabilization Corporation, which receives almost all flue-cured leaf on which the price bid is not higher than the loan rate, has the leaf redried and packed according to government grades. Even the subgrades are handled separately. This cooperative disposes of this leaf to domestic manufacturing firms, to exporters, and to independent leaf dealers; whether all purchasers examine samples from each hogshead or whether the purchase is simply on the basis of the government grade is not known to the writer. Even if purchase is on the basis of grade, whether this is the most satisfactory way for the buying firm to ascertain the *use* to which the leaf can be put, and its *value* in that use, is also not known.

in the government grading system, and see how tobacco placed in these sub-grades is handled by the principal buying firms. During the last four years V has been used as a suffix on B3L, B4L, B5L, B3F, B4F, B5F, C3L, C4L, X3L, X4L, X3F, and X4F.

The company grades assigned to these "V" grades can be seen from the tables in Appendix C—contingency tables showing how four of the five principal companies graded tobacco leaf placed in these "V" categories and in the government grades nearest to them. For this particular example, only lemon and orange leaf grades are shown. In few instances is any of the "V" tobacco placed in different company grades from the three-symbol grades which are closest to the V-grade in question. As an example, examine the B3LV grade. The largest number of piles was placed in 5L; more piles of B4L were placed in 5L than in any other grade. The disposition this company made of the government grades B3L, B3LV and B4L which it purchased are shown below.

TABLE I. CONTINGENCY TABLE FOR COMPANY GRADES AND SELECTED GOVERNMENT GRADES[a]

Government Grade	Company Grade						Total
	2L	3	4L	5L	7	Other Grades	
	(Percent)						
B3L	21.5	20.8	25.9	21.8	2.3	7.7	100.0
B3LV	4.9	12.2	29.3	34.1	19.5	0	100.0
B4L	5.2	8.7	20.9	38.0	16.2	11.0	100.0

[a] This table has been derived from the data in the table for Company 1 in Appendix C.

Thus there seems to be a basis for the hypothesis that this particular company graded B3LV the same as either B3L or B4L and not as a separate grade. To show a basis for the same hypothesis for the other companies and for additional government grades (not only special factors, but also colors, quality designations, and stalk groupings) would require considerably more analysis.

A further indication of the relationship of these special factors to other grades is given by a comparison of the average prices paid on the markets for these grades and the allied grades not designated by special factor suffixes. The following table shows the ratios for the average prices for Type 12 markets for the four years 1946 through 1949. A study of these ratios reveals that most of the B3LV

tobacco purchased brings the same price as BL4, that most of the B4LV brings the same price as B5L, but that the tobacco placed in B5LV is divided about evenly between being graded as the price equivalent of B5L and B6L by the company buyers.

TABLE II. RATIOS BETWEEN THE AVERAGE PRICES PAID FOR SELECTED GOVERNMENT GRADES OF TOBACCO LEAF, TYPE 12 MARKETS, 1946–1949[a]

Year	B3LV / B3L	B3LV / B4L	B4LV / B4L	B4LV / B5L	B5LV / B5L	B5LV / B6L
1946	0.98	1.02	0.93	1.02	0.89	1.09
1947	0.92	1.00	0.92	1.02	0.91	1.17
1948	0.94	1.00	0.90	1.00	0.89	1.07
1949	0.95	1.00	0.92	1.02	0.91	1.12

[a] Based on data obtained from the *Flue-Cured Tobacco Market Review*, U. S. Department of Agriculture, Production and Marketing Administration, Tobacco Branch, Washington, issues for 1949–50 and 1947–48 seasons, April 1950 and March 1948.

APPENDIX A

CONTINGENCY TABLE BY GOVERNMENT AND COMPANY GRADE FOR TOBACCO LEAF PURCHASES OF ONE BUYING COMPANY ON ONE MARKET DURING THE 1938–39 MARKETING SEASON

Government Grade Group[a]	Company Grade										
	1	2X	2	3X	3	4X	4	5	6P	6	C
	(Number of Piles)										
B1F						1					
B2F	6		3								
B2R	1		1		1						
B3F	66	11	65	3	34		2				
B3F off	4	2	17		16		8				
B3R	2		5		5		2				
B3L	9		11		2						
B3L off	1		3		2						
B4F	30	8	201	16	216	2	65			2	
B4F off	4		21	2	53		43	3		3	
B4R			3	1	8		4	1			
B4R off			2		1		6				
B4L	29	3	50	4	28						
B4L off	2		15	2	8		1				
B5F			25	7	171	5	145	52		19	
B5F off	20		2		18		23	5		8	4
B5R					2		8	3		1	
B5R off							2				
B5L	3		19	1	83		25	3		1	
B5L off		1	3		12		6	2			
B6F			2	1	17		38	26		42	41

APPENDIX A—*Continued*

Government Grade Group[a]	Company Grade										
	1	2X	2	3X	3	4X	4	5	6P	6	C
B6F off							1				7
B6R					1		4			7	37
B6L			1		10		3	3		7	3
B6L off											1
H2F	1		2								
H3F	17	2	23		4		2				
H3R			3		2		2				
H4F	11	1	53	6	91	1	15				
H4R			2		3		4			1	1
H5F	1		16	3	117		53	17		7	
H5F off					1						
H5R					5		7	1		4	
H6F			1		12		14	15		8	4
H6R								1		1	3
C3F	2										
C3L	2										
C4F	18		12	1	2						
C4F off	3		3		5	2					
C4L	17		10		1						
C4L off	12		6		2						
C5F	25	3	50		38		1				
C5F off	6	1	24		25		7				
C5L	20		36		9						
C5L off	2		6		5						
X1F	17		15	1	7						
X1F off	1										
X1L	14		17		1						
X1L off					1						
X2F	94	2	172	6	100		4				
X2F off	10		29	2	36		26	9		5	7
X2R			2		3						
X2L	42		108		37		2				
X2L off	2		11		11		1				
X3F	34	1	260	4	513		95	13		2	
X3F off	2		25	1	101	1	60	7		3	
X3R			4		2		8	1			
X3L	9	1	93	3	132		15	3			
X3L off	2	1	9		24		8	1		1	
X4F	2		16		207		111	30		17	4
X4F off			1		14		30	13		8	2
X4R							4			1	1
X4R off										1	
X4L			9		53		17	5		2	
X4L off				1	4		8			1	
X4F off										1	1
X5L					3		6	1		2	
P1F	5		8	1							
P1L	11		24		6						
P2F	8	2	41	2	21						

APPENDIX A—*Continued*

Government Grade Group[a]	Company Grade										
	1	2X	2	3X	3	4X	4	5	6P	6	C
P2F off			1		1						
P2L	44	1	140		39		1				
P2L off			1								
P3F	2		53	1	123		32				
P3F off			1		7		1				
P3L	16		188		274		39				
P3L off			1								
P3G					3		5				
P4F	1		5	1	45		44	3		6	1
P4L	1		12	1	184		100	3	2	1	
P4G					3		4				
P5F					2		4	1			
P5L					7		13				
P5G							1				
N2B										2	23
N3B											1
N1X							1	1			6
N2G											1
N2U							1				
N4U							1				

[a] The suffix "off" following the three-symbol grade designation indicates a generic category including all the four-symbol grade designations which could be derived from the three-symbol designation involved; for example, B5F off might include B5FV, B5FK, B5FW, B5FU, and B5GF.

APPENDIX B

In an analysis of the data in Appendix A, R. L. Anderson, Professor of Experimental Statistics, North Carolina State College, used analysis of variance techniques to measure the variations of company grades within and among various government grades. The company grade was used as the dependent variable, with each grade given a score corresponding to its grade number, e.g., grade 1 was scored as 1, grade 2 as 2, and so on. Low grade tobacco indicated as grade C was given the score 7. Special grade tobacco, indicated by an X (e.g., 2X for special grade 2), was omitted from the analysis. The government grades were classified as to numerical grade (2, 3, 4, 5, 6), Color (L, F, and R) and condition (off-grade and regular). Separate analyses were made for each of three stalk positions· Leaf (B), Smoking Leaf (H), and Lugs (X). Grades 3, 4, 5, and 6 were included for Leaf and Smoking Leaf, and grades 2, 3, and 4 for Lugs; all three colors for Leaf and Lugs, and F and R for Smoking Leaf; only regular condition for Smoking Leaf.

The residual variances (mean square deviations) after adjusting for government grade, color and condition were as follows:

Leaf	0.97
Smoking Leaf	0.82
Lugs	0.73

The most important single factor in reducing the over-all variation was the government numerical grade, since this factor (with color and condition held constant) accounted for 45 percent of the total variability for Leaf tobacco, 38 percent for Smoking Leaf, and 21 percent for Lugs. The most that color accounted for was six percent (Smoking Leaf), and similarly the maximum for condition was seven percent (Lugs).

The least squares techniques used to obtain these variances also furnish estimates of the differences in company score associated with differences in government numerical grade, color and condition. The average company score for each of these government classes, adjusted in each case for all other classes, are presented below; a low score indicates good quality.

Numerical Grade	Leaf	Smoking Leaf	Lugs
2	—	—	2.26
3	1.95	1.88	2.84
4	2.65	2.73	3.64
5	3.58	3.48	—
6	5.38	4.68	—
Color			
L (Lemon)	2.70	—	2.69
F (Orange)	3.28	3.12	2.89
R (Red)	4.10	4.20	3.68
Condition			
Regular	3.16	3.20	2.73
Off-grade	3.52	—	3.43

Certain observations might be made concerning these average company scores:

(1) The government numerical grade was generally about one unit above the company score except for Lugs, when the two were about the same. Lug tobacco seemed to receive a higher company score for the same government grade.

(2) The company score rose about 0.8 as the government grade changed from 3 to 4 and from 4 to 5; it rose 1.8 for Leaf and 1.2 for Smoking Leaf as the government grade changed from 5 to 6.

(3) The company score was from 0.2 to 0.6 larger for Orange over Lemon tobacco and from 0.8 to 1.1 larger for Red over Orange tobacco.

(4) Off-grade tobacco produced an increase in score of from 0.4 to 0.7.

APPENDIX C

CONTINGENCY TABLES SHOWING COMPANY GRADES FOR SELECTED GOVERNMENT GRADES, TYPE 12 MARKETS, 1948 SEASON[a]

Company 1

Government Grades	Grades[b]														
	aa	ab	ac	ad	ae	af	ag	ah	ai	aj	ak	al	am	an	ao
B3L	19	2	7	157	152	2	15	189	11	159		1	17		
B3LV				2	5			12		14			8		
B4L	1		3	22	37	1	23	89	16	162	2	1	69		
B4LV					3		4	4	2	7	1		10		
B5L				1	1		2	6	6	26	1		64		2
B5LV									1				11		
B6L	2									1	1		8		7
B3F		1	1	70	19		2	197	5	196			127		
B3FV					3		2	5		9			10		
B4F		1	1	15	8		4	96	11	266			486		15
B4LV					2			4		15			42		2
B5F					1			3	4	57			367		147
B5FV									1	2			24	1	18
B6F										1			64	1	100

Company 2

Government Grades	Grades[b]															
	ba	bb	bc	bd	be	bf	bg	bh	bi	bj	bk	bl	bm	bn	bo	bp	bq
B3L	12	6	7	38		1								1	1		
B3LV	2		1	7		1											
B4L	6	6	3	64			7										
B4LV	2		1	17			6										
B5L				11	1		16					2					
B5LV				4			5					2					
B6L				3								5	1				
B3F	67	20	20	152		12	11	1	1	3				1			
B3FV	4	1	2	7		1	3			3		1					
B4F	18	5	8	171	1	7	297	9	11	25		26	28	2		3	
B4FV	4		1	19		1	30	1		1		13	3	3			
B5F	2			15		1	124	3	6	3		194	59	64		36	30
B5FV				1			21					32	4	20		4	1
B6F						3	11				2	52	3	26		13	89

Company 3

Government Grades	Grades[b]							
	ca	cb	cc	cd	ce	cf	cg	ch
B3L	55	121	53	13				
B3LV	4	7	2					
B4L	14	58	53	24			1	
B4LV		1	3	3			1	
B5L	1		17	30			11	
B5LV			2	2				
B6L				8			2	
B3F	19	90	110	48			2	
B3FV	1	4	1				4	
B4F	4	51	156	171			137	
B4FV		2	7	12		1	7	
B5F		5	65	193			368	1
B5FV			1	6	1		23	
B6F			1	41			188	

Company 4

Govern-Grades	Grades[b]													
	da	db	dc	dd	de	df	dg	dh	di	dj	dk	dl	dm	dn
B3L	29	71	1	26	4									
B3LV	2	1		1										
B4L	1	26		24	6	4	2	4	2					
B4LV	1	1		2	1					2				
B5L				8						2	2			
B5LV					1									
B6L					1					1		1		
B3F		36		36	12					5				
B3FV		2		1										
B4F		32	1	62	41	2		2		19	1	2		
B4FV		2		1	2									
B5F				13	45	2		2	1	43	1	24	1	1
B5FV				1						1		2		
B6F					9					36				

[a] These data were provided by the Tobacco Branch of the Production and Marketing Administration. The sample was based on the sales on all warehouse floors on five given days during the 1948 marketing season. Dr. Clarence I. Hendrickson made the data available.

[b] Other company grades are also used in grading flue-cured tobacco; these listed are, of course, codes for the ones actually used for these Leaf (B) grades.

DISCUSSION

ARTHUR G. CONOVER
Bureau of Agricultural Economics

In these days when cigarettes are such a predominant part of total tobacco use in the United States, Professor Jackson has rendered a service by reminding us in his generally competent paper on tobacco products that it was not always thus. However, the preeminence of cigarettes over the combined total of the other tobacco products in terms of the tobacco absorbed in their manufacture came a little earlier than stated in the paper. In 1935, the tobacco used in cigarette manufacture for domestic consumption accounted for a little over 50 percent of the total; and by 1949, the proportion going into cigarettes had increased to 78 percent of the total.

The reasons for the downtrend in chewing products were succinctly stated by Professor Jackson. Although snuff has held its own in the aggregate, it has declined on a per capita basis by about one fifth over the past quarter-century. I disagree with the statement that "it is safe to conclude that a downward trend [for cigars] has existed for the last 20 years." Following the sharp drop to the low point in consumption in 1933, cigar consumption rose gradually until 1943. Since then, it has fluctuated moderately, but a trend-line for the recent 20-year period for total cigars would be virtually horizontal or slightly upward. However, per capita consumption has declined by approximately one fourth from the level of the late twenties. Four reasons for the lack of growth in cigar consumption are: (1) frequently cigars are not convenient to smoke in numerous working and other living situations; (2) cigars involve a larger expenditure than many smokers care to make; (3) there is a fairly widespread impression that a cigar is a strong smoke; and (4) many consumers apparently prefer

the kind of satisfaction derived from other tobacco products, especially cigarettes.

Inasmuch as smoking tobacco consumption is only about one half the level of the 1930's, I believe that even after making allowance for differences in family incomes, such a drastic decline is evidence that a downward trend existed. Since the end of World War II, use of smoking tobacco has been on about a dead level.

The section of the paper devoted to cigarettes is of particular interest. The growth of this product has been phenomenal. Several valid points were made with respect to factors related to this upward trend. One aspect was probably given too slight attention. I believe that many new cigarette smokers have been made as the result of the strong human tendency to be imitative. The large expenditure by the major cigarette companies for advertising may have accelerated the trend 10 to 20 years ago, but I doubt that paid advertising has been as influential in increasing total cigarette consumption as has been supposed. Cigarette smoking has grown considerably in western Europe and other areas of the world where people have not been exposed to such extensive promotional advertising as is carried on by the large manufacturers in this country.

The paper under discussion mentioned the diminishing differences between rural and urban consumption of cigarettes. Available data certainly seem to indicate this. The narrowing of the gap between farm and nonfarm per capita incomes over the past decade has probably been an influential factor, as has been the sharper impact of the urban and suburban cultural pattern. The variation in per capita cigarette consumption among states appears to be associated to some extent with the differences in per capita income among states.

Professor Jackson quotes some percentages of the men and women smoking cigarettes in the mid-thirties as about 50 and 20 percent, respectively. Surveys in the last three or four years reported in trade journals (two that were fairly extensive) indicate between 65 and 70 percent of the men and 40 to 45 percent of the women smoke cigarettes. A Canadian survey covering 60 cities showed about the same proportions. An excellent survey on the pattern of smoking habits in Great Britain showed 69 percent of the men and 39 percent of the women smoke cigarettes. If a survey similar to the British one were available for the United States, we would know much more about the nature of tobacco consumption in this country.

DISCUSSION

CHARLES E. GAGE
American Tobacco Company

Mr. Martin's interesting paper peers into the pricing efficiency and operational efficiency of the tobacco auction marketing system from the standpoint of economic theory. The questions he raises are of great importance, and my own discussion will be an attempt to contribute in some small measure to a correct appraisal of the practical marketing operations under study. In doing so it is not my purpose to essay the role of advocate for the auction system but rather, if possible, to throw light on phases of

the subject with which I became familiar as Director of the Tobacco Branch in the U. S. Department of Agriculture. Let me emphasize that I am not speaking as a representative of the Company with which I am associated. I make this clear for the reason that it is the policy of my company in its purchasing of leaf tobacco to conform to whatever method of marketing the growers of the tobacco choose, and not to become involved in any controversy concerned therewith.

Factors Related to Pricing Efficiency

Mr. Martin calls attention to the wide variations in prices paid for tobacco of the same government grade, and since these price variations are of importance in the development of his paper, a fuller understanding of them is in order.

Mr. Martin states that "simply and fundamentally, a grade is supposed to reflect product substitutability in use and/or different uses of perfect substitutes."

A factor not generally understood is that the variations in the characteristics of tobacco are many, and the possible combinations of those characteristics are still more numerous. One might almost say they approach infinity. To those accustomed to thinking of commodities like grain, potatoes, and almost any other farm commodity, it may seem incomprehensible that grade does not imply as high a degree of substitutability in tobacco as it does in most other crops. Tobacco may be grainy, slick-faced, oily, dry natured, spongy—to mention only a few of the adjectives commonly used. Tobacco men use the term "side." For example, they may buy a particular side, as the "thin" side, or the "leafy" side, the "ripe," etc., etc. The term side is widely used, and in general it connotes one particular characteristic that may be of substantial importance to one or numerous companies. But that particular side or characteristic is only one of several which may or may not be treated as one of the elements of quality recognized in the specifications of U. S. Standard Grades.

I think it may be said that there is a high degree of substitutability as to tobaccos which fall in the "middle" of a straight grade, but not those which are borderline, mixed, or which exhibit side not indicated in the grade symbol.

The utility of tobacco for specific manufacturing purposes depends mainly on two classes of characteristics: those which have to do with chemical composition of the leaf; and those which have to do with its physical suitability for the intended manufacturing operations. To these must be added the more intangible factors of aroma and "character."

The importance of chemical composition of tobacco, especially for cigarette purposes, is so great and its relationship to questions of pricing efficiency so direct that it needs to be elaborated somewhat.

If flue-cured tobacco goes through a growing season under optimum conditions as to sunshine, temperature, and rainfall, and if the successive primings are made when the leaves have reached just the right stage of maturity, then the leaf will enter the curing stage under the conditions most favorable to an outturn of fine, ripe mellow tobacco. That is to say the leaf development will have progressed along the most desirable lines,

in physical and chemical characteristics. From that point on, the tobacco having been racked up on the tier poles of the curing barn, it enters the final and perhaps most critical stage of all—curing. If during the next day and a half to two days the temperature and humidity in the curing barn are regulated just right, then while the leaves are still alive the chemical changes already in process, especially the conversion of starch into sugar, will be completed, and the color will be set. Then the temperature may be raised until the tobacco is killed out and the stems have become dry.

Now, if all seasons were ideal and all harvesting and curing operations also conformed to the ideal, there would be vastly less side factor tobacco and the problems of buying would be greatly simplified. But because of the vagaries of weather and the human factor, departures from the optimum are the rule rather than the exception. Thus it turns out that the all-important chemical processes are in constant danger of being interrupted or otherwise adversely affected. The important point from the standpoint of pricing efficiency is that these adverse circumstances are to a large extent recorded in the physical condition and appearance of the tobacco, for the benefit of those who have the training and discernment to read the signs. Few buyers have any real knowledge of chemistry, but many of them develop exceptional skill in reading the signs. That is what it takes to be a good judge of tobacco and a good buyer.

Now, what has this to do with the pricing efficiency of tobacco auctions? A buyer must constantly be on guard against tobacco which may appear to fit one of his company's grades but which on closer inspection betrays an undesirable side, or may be lacking in some important respect. All this reacts on competition.

To give a concrete illustration of the effects of these things on competitive bidding and on the variability of prices, assume that three successive piles of tobacco cried by the auctioneer are of a government grade generally considered good cigarette tobacco. Assume further that the tobacco is correctly graded but that slight variations and mixtures are present which, while they do not invalidate the grade, do affect the usefulness of the tobacco as viewed by some companies. Assume also, for the sake of simplicity, that there are only three buyers, A, B, and C. The following situations may arise:

First Pile
- A. Considers tobacco high grade for cigarettes
- B. Considers tobacco high grade for cigarettes
- C. Considers tobacco high grade for cigarettes

Result: Active competition; high price.

Second Pile
- A. Same as before
- B. Same as before
- C. Finds that the tobacco has a "side" which his company does not want, or lacks some characteristic that his company does want.

Result: Lessened competition; lower price.

Third Pile
- A. Same as before
- B & C. Both believe the tobacco has objectionable characteristics, or is lacking in some respect.

Result: Active competition eliminated; low price.

Except as to the number of buyers, the above is not at all an extreme case.

The factors which may give rise to incomplete competition are many. The single question of maturity is one. Not only may buyers differ in their appraisal on the score of the maturity of the leaf, but their respective companies may attach varying degrees of importance to maturity as an element of quality. The point is that influences such as this are ever-present in a tobacco auction, and account in no small measure for the variability of prices on a grade basis.

An important factor associated with the foregoing is the lack of uniformity in the initial sorting of tobacco into farm grades before it is delivered to market. Prior to World War II, the sorting of tobacco by the growers was characterized by a fairly high degree of uniformity. To maintain uniformity, their tobacco was placed on the warehouse floors in relatively small piles or baskets. The choice grades such as wrappers seldom reached 75 pounds per basket, and it was not uncommon to find baskets of only 25 or 30 pounds. The average weight of baskets for all grades combined during the 1930's was probably little more than 125 pounds.

The conditions surrounding the production and marketing of tobacco during World War II led to marked changes in this situation, such as poorer sorting and baskets of materially increased size, wherein two or more farm grades are often brought together. The scarcity of labor on the farm has largely precluded the painstaking effort necessary for meticulous sorting and the fierce competition for the scanty supply of new tobacco and more particularly the application of ceiling prices during the war years tended to eliminate the premium prices buyers were formerly able to offer for cleanly handled and carefully sorted tobacco. Manifestly, since extra care in handling represents an additional outlay of money on the part of the growers, unless buyers pay a premium for such extra care no criticism can be leveled at the growers for failure to incur the expense of careful sorting.

The above situation has important effects on the pricing of tobacco. In the first place, buyers and government graders alike judge tobacco by what they pull from the basket. While they endeavor to protect themselves by making two or more pulls there is certain to be some variation in the sampling of a badly mixed pile. This may be true not only of successive pulls by one man, but in the average quality pulled by different men. It will be seen that this situation lends itself to inconsistency in the judgment of tobacco, either by one man, as for instance, a single buyer or the government inspector, or among several men as in the case of a group of buyers.

For other reasons one should not expect close correlation between government grades and prices. In the first place, it often becomes necessary in connection with badly mixed tobacco to assign a compromise grade. Also, there is no such thing as a clear-cut line of demarcation between grades, even though no question of mixture is present. The factors or elements of quality which have to do with grade vary by almost imperceptible degrees, so that it becomes a matter of personal judgment where one grade ends and another begins. Inevitably some tobacco is so close to the borderline, in respect to percent of injury, for example, that no substantial error would be made or avoided to whichever side of the line the grade might be assigned by the inspector. Many a lot of tobacco is either just a wee bit too

good for, say, third quality and is therefore placed in second; or on the other hand is almost but not quite good enough for a second, and is therefore placed in third quality. How much difference in value are we to ascribe between a low B2F and a high B3F? Probably none, and if the B3 were to outsell the B2 it might easily be due to some inherent characteristic not reflected in the grade, or to a superior sample drawn by the buyer. And surely the difference in actual quality might be not so great as between a high B3F and a low B3F,—that is, between one almost a B2F and another just barely too good, we will say, for a B4F. In one case the difference is debatable; in the other the difference amounts to almost one whole grade.

If an easily perceptible range of quality exists within a single government grade, why not narrow that range by having more grades? That would complicate rather than simplify government grades and lead directly to more errors in their application. There may be too many grades now.

These observations are made in the hope of inducing a better understanding of the limitations of government grades and not in derogation of them. Government grades represent, in my firm belief, the greatest if not the only scientific approach to a system of indicating by code symbols gradations in the physical characteristics of tobacco. In function, purpose, and basis they differ from most private grades. The latter, at least from the standpoint of manufacturing companies, are designed to give greater emphasis to desirable "side" and avoidance of undesirable side than is practicable or necessary in government grades. Government grades must cover the whole range of tobacco appearing on the market. Private grades are restricted to those particular qualities and characteristics of leaf needed by the company concerned in achieving and maintaining its own blend.

It would be difficult to enumerate all the possible causes of grade-price variations. In addition to those already indicated, some are due to errors in judgment on the part of government graders and company buyers alike, none of whom is infallible. These men are called upon to make 300 to 400 determinations of quality per hour, and errors are unavoidable. I would guess that the bullish and bearish effects of errors of judgment are about 50-50. Oftentimes buyers detect some off odor, such as oil or oil smoke from the curing operation, a mouldy condition, an odor indicating that the tobacco has begun to heat, or that a malodorous insecticide has been used on the tobacco or some adjacent crop and carried over by a passing breeze. In such a case the price will be seriously affected. Then some variations result from chance conditions,—such as variations in light on the warehouse floor, changes in light due to passing clouds, snowy weather, incidents distracting the attention of buyers during the sale. Still others may be due to the slackening of buying by a company whose redrying facilities have become glutted; or whose requirements for certain grades are approaching fulfillment. More broadly, the whole market may be affected upward or downward, by changes in the crop estimates.

And so on *ad infinitum*.

All this may sound like an attempt to rationalize on the basis of economics all the price variations that characterize an auction sale. It must be recognized that there are limits to such rationalization, and that variability and uncertainty are inherent in that method of selling tobacco or

anything else. An auction sale is that method by which one bidder hangs on until all others have dropped out. His tenacity is based on what he considers good and sufficient reasons, but the amount of his last bid is what competition has forced him to offer, not necessarily on a fine determination of intrinsic value. No doubt he would have been glad to get the tobacco for less, but he might have gone higher if necessary. In the foregoing, therefore, I have attempted to describe some of the factors which enter into a buyer's judgment and which contribute to fluctuations in competition.

There is, I think, a tendency to assume that all cigarette companies buy the same tobacco and that their buyers react alike, or should, to tobacco offered on the auction floors. This is an entirely superficial view. Different companies attach varying degrees of importance to the inward characteristics of tobacco manifested by its physical attributes. Different companies have diverse ideas on the types and grades that will "work" together, and of the proportions of each appropriate to a harmonious, tempting blend. Therefore, it must be assumed that although some tobacco meets the highest standards of practically all cigarette companies, their ideas on and purchases of many grades vary widely. Always there are grades and sides which some companies buy and others avoid. Each buys according to its own formula, and each very properly makes every effort to protect the integrity of its own blend.

Mr. Martin refers at one point to "measurable characteristics" and probably recognizes that among the immeasurable characteristics is the question of aroma. It is in precisely this field that the blender's art comes into play in bringing together types and grades which will fall in an acceptable range chemically speaking, and yet produce the desired result from the standpoint of aroma, which so far has defied chemical analysis.

Factors Related to Operational Efficiency

One very important function of the auction process is missed by Mr. Martin, and for that matter I do not recall that the literature calls attention to it. I refer to the fact that the classification of leaf tobacco into grades by the buyers as the sale progresses is the key to a sorting and assembling operation which takes place on a grand scale and under urgent time limitations. The marketing of a billion to a billion and a quarter pounds of flue-cured tobacco during a period of four to five months means that for much of the season the daily sales may run from 20 to 25 million pounds a day, or the equivalent of 20 to 25 thousand hogsheads of tobacco, which at that stage is a perishable commodity; further, that by this operation this torrent of tobacco is channeled swiftly into the possession of a large number of buying companies, assembled on the basis of the company grades, given a further sorting for the removal of off-grade tobacco, redried, packed into hogsheads and moved into storage. Thereafter, these hogsheads are numbered and so recorded as to type, grade, crop year, and location that they may be readily called up according to the nature of later requirements. This is an operation of the first order in magnitude and importance.

Following a brief but excellent statement of the stages of producing and marketing a crop of flue-cured tobacco, Mr. Martin cites as an example of the questions that "immediately come to mind"—

"Why is all the time-consuming and labor-using movement between the farm and the redrying plant necessary? Why could not the leaf be transported directly from the farm to the redrying plant? These questions appear to concern the matter of operational efficiency."

Then, as a possible prelude to discussion of pricing efficiency, he supplies briefly the reply most likely to be elicited from men in the trade. Since Mr. Martin does not clearly endorse that very obvious answer, and since others may reject it, the question deserves fuller discussion.

Let us suppose that an attempt were made to substitute for the auction method of marketing tobacco one wherein the tobacco would be delivered direct from farm to redrying plant. Then, not only is the opportunity for competitive bidding lost, but each farmer is confronted with this question, to what redrying plant shall he take his tobacco? Manifestly if it is mainly export type tobacco he would be wasting his time by taking it to a domestic manufacturer; and if domestic type tobacco, how could he know which company to try first? The first such plant visited might or might not find a portion of his crop suitable for that company's use. What must he do next, peddle it from plant to plant? It must be remembered that all redrying plants are operated by individual buying companies. Also, the number of redrying plants is only a fraction of the number of warehouse floors to which tobacco growers by the thousand now haul their tobacco, and many markets have none at all. There are only two small ones in Georgia, and none in Florida, most of the tobacco being shipped to North Carolina for redrying. What will happen when growers by the thousands converge on the available redrying plants and begin shifting from one to another in search of buyers for their tobacco? This implication of chaos speaks for itself.

By way of contrast it may be noted that the auction system makes possible of achievement the following twin objectives:

1) The parceling out of each individual grower's crop, basket by basket, among those manufacturers and dealers who find in it grades suitable to their respective needs.
2) Assembling into hogshead lots tobacco selected from many different farm crops for uniformity and suitability for specific uses.

These objectives are of such paramount importance that in my opinion no substitute for the auction system would be workable if it did not make provision for them.

My purpose has been, not to challenge the pursuance of research such as Mr. Martin's, but rather to contribute if possible to a better acquaintance with the patient to be operated upon,—before the operation! The auction marketing system is the result of a process of trial and error that has been going on for more than a century. During that time many rough corners have been knocked off, highly specialized techniques have been developed, and the pattern of a wide range of domestic and foreign trade activities has been conditioned by it. Always the general trend of development, especially in recent years, has been toward greater protection of the grower's rights and interests. Auction marketing still has its defects, and perhaps research will point the way to improvements or to something better. In any case it would be a mistake to focus attention on defects of the present system to the exclusion of its solid virtues.

THE IMPACT OF COMMODITY CREDIT CORPORATION OPERATIONS ON FARM MARKET PRICES AND MARKET CHANNELS*

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LOOKING at the record, I think it is clear that the operations of the Commodity Credit Corporation have at times greatly influenced market prices and affected market channels. I am reviewing the record as one who accepts the Corporation as an established and valuable institution in implementing a national farm program. I am taking note of criticisms of the operations of the Corporation, including statements that it creates monopolistic conditions for farmers, costs taxpayers a lot of money, holds up prices to consumers, and, in general terms, moves toward nationalizing production and developing State trading. While one may recognize some basis for these criticisms, the record shows that such statements generally are exaggerated. The objective of the operations is primarily to protect the income of farmers, but with due regard to the maintenance of supplies to consumers and orderly distribution through the private marketing system.

In the Commodity Credit Corporation Charter Act of 1948, the purposes of this Corporation are stated to be: (1) To stabilize, support, and protect farm income and prices; (2) to assist in the maintenance of balanced and adequate supplies; and (3) to facilitate the orderly distribution of agricultural commodities.

The operations commonly referred to as "price programs" include the price support program, the International Wheat Agreement, Section 32 programs, the National School Lunch Program, marketing agreement and order programs, and the sugar program. These programs are all related, but I cannot undertake to deal with all of them in detail. Time and space seem to require that I concentrate on the price support program. In fact, I cannot deal adequately with all the important aspects of this program. Therefore, I must confine my observations to a few points which I consider most important with reference to this program.

* This paper presents the personal views of the author and is not intended to represent any official position or views of any agency in the Department of Agriculture.

Price and Income Supports

The price support program has contributed materially toward stabilizing farm prices and income in the postwar adjustments to date. The postwar reductions in the receipts of farmers from marketings and in net income to date have been less than one half as great as immediately following the First World War. Within 12 months beginning with May 1920, the average of prices received by farmers declined more than 50 percent. From 1919 to 1921, cash receipts from marketings declined more than 40 percent, and the realized net income declined 60 percent. The postwar adjustments beginning with January 1948 extended through two years, and the reductions have been much more moderate. The average of farm prices declined 23 percent from January 1948 to December 1949. From 1947 to 1949, the receipts from marketings declined only about 10 percent, and the realized net income, 22 percent. The decline extended into 1950, but the bottom has been reached and recovery is under way. While the CCC operations are not solely responsible for reducing the shock, they certainly have contributed to this end.

Furthermore, I think it may be added that the operations of the CCC have made some contribution towards stabilizing the national economy in postwar adjustments. The large volume of operations in 1949 undoubtedly was a stabilizing influence against the general price decline and business recession. It served as a check to deflation. In the turn in 1950, the availability and release of accumulated supplies are a check against price inflation.

Undoubtedly, the prewar price support operations beginning in 1933 contributed toward stabilizing prices and income to farmers. The prices of corn and cotton were raised to some extent and stabilized, beginning in 1933, through 1934 and 1935, and again in the years 1938–41. Wheat received significant support in the years 1939–41. Analysts are not in agreement as to the amount of the average increase in prices and income realized by growers from supports in this prewar period. However, I think it is evident that with the advancing price level and the great demand for products at the outset of the Second World War, the operations of the Corporation contributed significantly at the weakest points toward raising and maintaining the level of prices and incomes to farmers.

I am passing over the operations of the CCC in the war period because I think our primary concern with the impact of the opera-

tions of the Corporation is in relation to peacetime conditions. There is no question in my mind but that the Corporation played a very important role with great success in managing purchase operations and the distribution of supplies in the war period. At some points, support operations even in this period were significant. However, in this period the greater contribution was toward the maintenance of balanced and adequate supplies.

Let us consider briefly the difference in the prewar and postwar conditions of CCC operations and results. Prewar, the price level was advancing. At the beginning, prices were far below parity. Loans were far below parity. Loans were authorized at 52 to 75 percent of parity. Some were made close to the minimum level. The loans were protected by some degree of acreage control. The significance of production control has been questioned, and analysts have pointed out that the accumulation of stocks to be sold later tends to limit or place ceilings on prices to be realized in the future. In the case of cotton, I think it is obvious that prewar price maintenance contributed to the development of both domestic and foreign competition. While prices were temporarily raised and stabilized, in the long run cotton producers lost part of their market. However, in case of commodities for which there is a maintained or upward trend in demand, a rising price level provides opportunities for successful price support and storage operations.

Postwar price supports against declining prices face much more difficult problems. In the experience of the years 1948–50, we can see clearly that a decline in the general price level throws a heavy weight on support operations, and that commodities for which the demand is declining or not increasing can involve the Corporation in heavy losses.

The difference in postwar and prewar conditions is also, of course, very significant in cost to the Government. The net loss on operations, 1934–41, was only $56 million. This was more than offset by net gains on operations in the war period. At the end of the fiscal year 1946 the net on operations to that date was a gain of $126 million, but in the last two fiscal years, 1949–50, realized losses have amounted to over $500 million. This loss could be offset to a considerable extent by gains now in prospect from rising prices for commodities held by the Corporation.

The losses of the CCC to date have been much exaggerated in the public press. The global loan and investment figures attract atten-

tion. The total of loans for the years 1934–49 amounted to over $7.5 billion, but the realized losses amounted to only $387 million. Furthermore, it should be noted that a large part of the losses incurred has been on perishables. The losses on potatoes alone amounted to about 90 percent of the total. The CCC reported having over $3.5 billion invested in the price support program as of June 30, 1950. The realized loss in the year is reported to be only $249 million. The large volume of storable commodities on hand at the end of the fiscal year 1950 is needed as security for the future and is likely to pay off a net return on loans and investments.

However, the volume of loans outstanding and the CCC inventory holdings are sometimes a very significant factor in the market situation. The highest volume of loans in the prewar years was registered in 1939—$458 million. At the end of the 1950 fiscal year, the loan obligations of the Corporation amounted to $914 million and about $2,624 million was invested in inventories, making a total investment on the part of the Corporation of $3,538 million. This is more than 10 percent of the value of all farm marketings in the year.

More significant is the concentration of holdings in a few commodities. More than one half of the outstanding loans was on corn, and more than half of the investment in inventories was in corn, wheat, and cotton. As of July 1, 1950, the Corporation was carrying the bulk of the stocks in the country. The inventory included about three fourths of the carryover of wheat and about one half the cotton stocks. The corn under loan and in inventory amounted to more than one half of the total stocks in the country and exceeded the average annual farm sales of corn.[1] Under these conditions, the Corporation in effect is in position to ration supplies and fix price limits until new supplies come into the market.

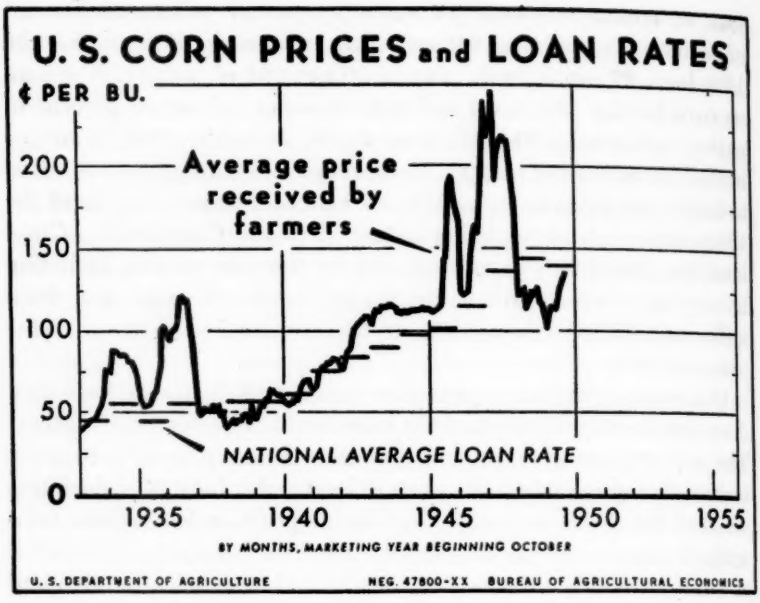
Significant factors in the higher postwar investments and losses and in the extent of Government operations are the downward adjustment in prices, the higher level of prices, higher loan rates in relation to parity, and extension of the coverage of commodities. The decline in the average of farm prices from an index of 306 in January, 1948, to 233 in December, 1949, was a very significant factor in the operations of the last two years. Even the lower 1949 level was about three times that of the latter half of 1933. The 1933

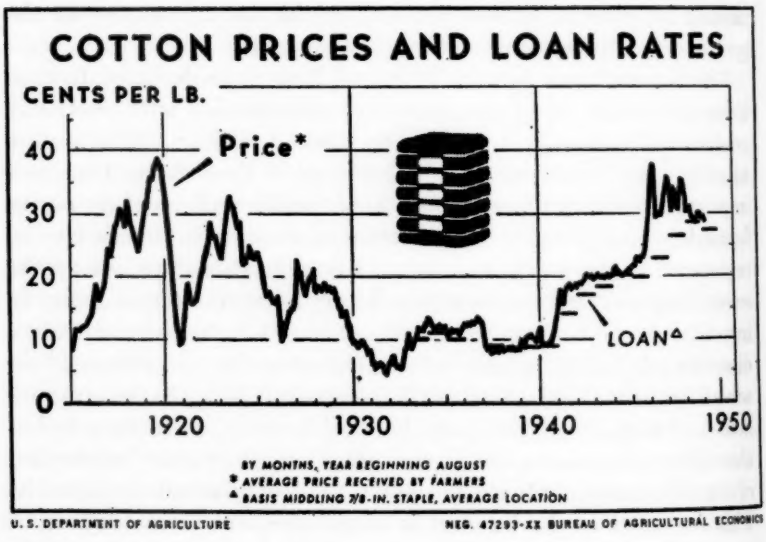
[1] Other significant holdings included large volumes of linseed oil, butter, dried milk and dried eggs, and grain sorghums.

loan on cotton was only 10 cents per pound—about 69 percent of parity—whereas the 1948 crop loan was nearly 29 cents and the 1949 loan, 27 cents (each year at 90 percent of parity). The loan on corn for the 1933 crop was only 45 cents—about 55 percent of parity—whereas in 1948 the loan was $1.44 and in 1949, $1.40 per bushel (90 percent of parity). Large crops and falling prices resulted in large quantities being put under loan and large volumes of the 1948 crops under loan being delivered to the Corporation. Commodities added to the support list in the war period, including linseed oil, grain sorghums, dried eggs, beans, flaxseed, and dried milk, contributed substantially to the increased volume and value of inventories.

One commodity item—potatoes—has led all the rest in losses but does not show up significantly in loans and purchases for inventory. The accumulation of losses on this item is due primarily to great technical improvements in production in the face of a declining demand for the commodity. Significant postwar losses have been realized also from eggs and dried milk, which may be designated as semi-perishable commodities for which there is a limited demand in the United States. The losses on these items, among others, are to a considerable extent chargeable to the undertakings to maintain needed supplies in the war period, and the promise to protect the producers of these commodities after the war.

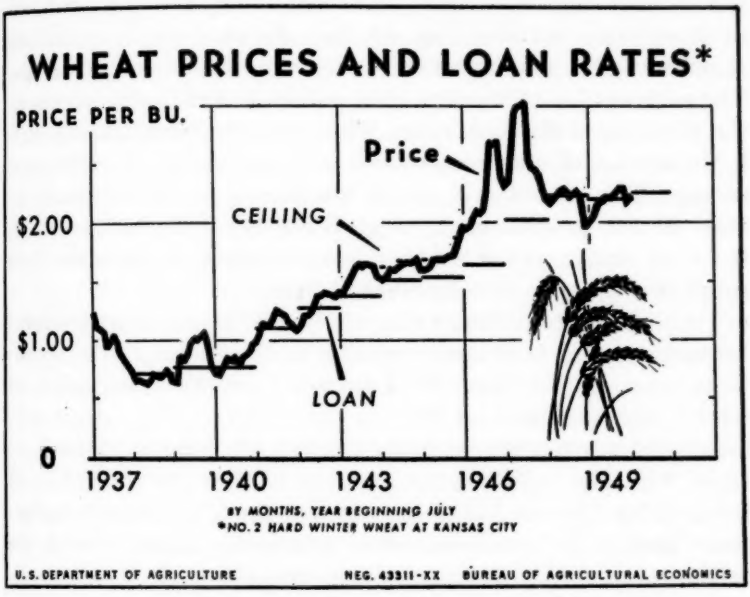
The Agricultural Acts of 1948 and 1949 were designed to continue the policy of price and income stabilization with necessary postwar adjustments. In this connection, I wish to call attention to only a few significant points involved in these Acts. The most important point common to both Acts was the revision of the parity formula which permits the reflection of changes in demand to be registered in the parity and support level relationships among the several agricultural commodities. In my mind, the second point in importance is the provision of schedules with administrative discretion in applying loan rates to the several commodities. These schedules permit the adjustment of loans in relation to the accumulation of supplies, which may be used to stabilize income rather than prices to farmers, and to encourage a more orderly distribution of supplies coming into the market in years of relatively high yields. This feature also can be used to avoid excessive accumulations of supplies in the face of declining demand and a downward trend in prices. In several cases, the support levels announced for 1950


U. S. CORN PRICES and LOAN RATES
¢ PER BU.
200
150
100
50
0
Average price received by farmers
NATIONAL AVERAGE LOAN RATE
1935
1940
1945
1950
1955
BY MONTHS, MARKETING YEAR BEGINNING OCTOBER
U. S. DEPARTMENT OF AGRICULTURE
NEG. 47800-XX BUREAU OF AGRICULTURAL ECONOMICS


COTTON PRICES AND LOAN RATES
CENTS PER LB.
40
30
20
10
0
Price*
LOAN△
1920
1930
1940
1950
BY MONTHS, YEAR BEGINNING AUGUST
* AVERAGE PRICE RECEIVED BY FARMERS
△ BASIS MIDDLING 7/8-IN. STAPLE, AVERAGE LOCATION
U. S. DEPARTMENT OF AGRICULTURE
NEG. 47293-XX BUREAU OF AGRICULTURAL ECONOMICS

crops have been set in view of these important considerations.

Let us now take a look at the consumer side of the record. I have already referred to the fact that in the war period the activities of the Corporation were concerned to a significant extent with the maintenance of an adequate and balanced supply of products. Since 1933 the production of food and agricultural raw



materials has increased more than the population. In 1950 all agricultural production is estimated at 37 percent above the prewar level and food production is about 38 percent above that level. Food consumption per capita is estimated to be about 11 percent above the prewar level. Moreover, the consumption is of higher quality. Diets have improved. Food prices are higher, partly because consumption has shifted to higher priced foods, but primarily because of more money and the higher general price level. The most significant fact about the food situation is that if consumers were buying and using only what they used before the war, it would require only about 18 percent of their disposable income, whereas in 1933 it required 27 percent. The higher level of consumption is requiring only 25 percent of the disposable income, as compared with 24 percent for 1933.

The price support program, with accompanying controls, has at no time significantly curtailed the over-all volume of supplies available to consumers in the United States. In every year but one, 1935, the per capita food available has been larger than in 1933. The reduction in the supplies for this one year was effected primarily by the drought of 1934. Some potatoes have been destroyed, but without supports some of them would not have been produced or at any rate not been dug. At times the controls have affected significantly the plantings and the current production of some crops. The program for 1950 called for a reduction of 35 million acres in the plantings of the basic crops. There was a substantial reduction in the acreage of wheat and cotton, and some reduction in the corn acreage. The reduction in cotton has proved to be too drastic in view of the present emergency. However, shifts in plantings, technical skill, and the weather, are providing an adequate food supply for the year, equal to that of 1949.

The directive to facilitate the orderly distribution of agricultural commodities has most direct relation to the impact of the operations upon market channels. I interpret orderly distribution to refer to the avoidance of gluts in the market unduly depressing prices and moving the products through the regular channels of trade. The intent of Congress, as stated in the Commodity Credit Corporation Charter Act of 1948, is that the Corporation's operations "shall, to the maximum extent practicable consistent with the fulfillment of the Corporation's purposes and the effective and efficient conduct of its business, utilize the usual and customary channels, facilities, and arrangements of trade and commerce."

This statement of policy in the Charter Act of 1948 is reinforced in the Agricultural Act of 1949 in language as follows: "In determining sales policies for basic agricultural commodities or storable nonbasic commodities, the Corporation should give consideration to the establishing of such policies with respect to prices, terms, and conditions, as it determines will not discourage or deter manufacturers, processors, and dealers from acquiring and carrying normal inventories of the commodity of the current crop."

The impact of the operations of the Corporation upon the private marketing system is conditioned substantially by the level of supports, the price support methods, and administrative procedures.

The price support level has much more significance in relation

to marketing channels than is generally recognized. Support levels may be so high as continually to require CCC operations in the market. In years of heavy production with normal or below normal demands, the CCC becomes inevitably a dominant factor in the market. Stocks are accumulated to hang over the market through the following seasons. This, of course, discourages private storage and holding operations for periods of any length. In case of perishables, the fresh stocks do not accumulate, but large proportions will be channeled through the Government operations in some form or another; and storable products processed from perishables tend to accumulate, as in the case of storable basic commodities.

A high support level requires high subsidies to dispose of surplus commodities. The higher the level of supports, especially in the face of a declining price level, the more extensive the production and marketing controls required to protect the program.

The method of applying supports also has a very significant relation to marketing channels and the functioning of the private marketing system. In fact, it is important also to the consumer. The application of the support may be such as to discourage, or at any rate not encourage, the maintenance of the quality of the product. If proper differentials are not applied, the producer may be encouraged in volume production without regard to quality. Differentials are important both as to grade and regional distributions. Any tendency toward establishing flat support levels blocks quality marketing and efficiency in distribution.

In cases of the marketing of products of which there is regular seasonal distribution of production, the level at which supports are placed and the method of applying them are very significant matters in relation to regular channels of trade. A notable case now is that of butter. Since the production of butter is heaviest in the spring and lightest in the fall, the private trade generally accumulates stocks in the heavier production season to be distributed in the season of lighter production. Normally, prices rise from 15 to 20 percent from May or June to December. This is the incentive for storage. The program inaugurated for supporting butter in 1949 provided for only a minor seasonal adjustment, and in 1950 no seasonal adjustment.[2] The support prices for butter, cheese, and dry milk have been very stable—almost flat—since the beginning

[2] The release point is high enough above the support level to permit some advance in price. This is five percent plus carrying charges above the support level.

of 1949. Consequently, the trade holds only small stocks and the Government holds large stocks.

Another significant point involved in supporting the manufactured dairy products is the relation of the support level for dry skimmed milk to that of butter and cheese. It seems to me that the relationship established between these commodities is such as to encourage the utilization of milk in surplus manufacturing of these commodities. Perhaps the support level for all of them is too high in relation to other foods and competing products, but the point I wish to register here is that the seasonal and inter-commodity relationships may be such as continually to increase the burden of the CCC operations and to divert distribution from the regular channels.

Many complaints of the administrative procedures in carrying out support programs are to be noted in the press, and we hear many in Washington. For example, a conference of representatives of farm commodity marketing associations met in Chicago on September 29, 1949, to consider the encroachment of the CCC in the field of farm marketing. A *Declaration of National Marketing Policy* was issued under date of October 10, 1949, which included the following significant statements:

"We are convinced after careful study that the Department of Agriculture through the Commodity Credit Corporation is steadily invading the field of farm marketing to an extent where the best interests of American agriculture are in jeopardy.

"Farmers and consumers will not gain by the substitution of programs of action by the Government for the exercise of free enterprise activity by individuals, partnerships, corporations, and by farmers themselves through their cooperative marketing associations. Instead, such activity by the government will lead to inefficiency, high costs, and to abuse.

"There is a critical need for reexamination by Congress and the Administration of the trend toward a government monopoly of farm marketing. Day by day and week by week evidence piles up of a further drift in this direction by the Commodity Credit Corporation that leads on only to ultimate nationalization."

This Declaration was aimed partly at pending legislation which included a provision for an Assistant Secretary of Agriculture "in charge of sales operations." This was considered a threat to private trade and it was deleted from the pending bill.

Subsequently, October 31-November 1, representatives of farmers' marketing cooperatives, together with representatives of other

farm organizations, met in Washington to appeal to the Secretary of Agriculture for more adequate administrative recognition of the functions of private enterprise in carrying out the CCC marketing programs. These protests were largely directed at changes or proposed changes in practices which would reduce the effectiveness of cooperatives in dealing directly with farmers, and which would tend to place the handling of loans and the marketing of products taken over by the CCC more directly and more completely through the PMA organization. The Administrator responded to these criticisms in an article published in the *Southern Planter* in May 1950. In that article, we find the following:

"The suggestion is sometimes made that CCC 'competes with' private business, doing some things which the trade could do just as well or better. To this I can only say that we who are responsible for CCC operations believe unreservedly in the free enterprise system upon which our American economic life is based. We never propose using the authority or funds of the Corporation for any undertaking which will be handled efficiently and adequately by established businesses or services. Put another way, we use CCC only to do those emergency jobs which will not be carried out effectively otherwise."

This declaration of administrative policy is, of course, in line with the desires of the representatives of the cooperatives. However, the constant vigilance of the Administrator and consultation with the trade are necessary to keep operations in line with such a policy.

The price support program also becomes involved in international relations in affecting prices and channels of trade. Supporting prices above foreign market price levels requires subsidies to move surplus products into foreign markets, and restrictions on the imports of the products of other countries. Trade restrictions and Corporation activities in selling directly abroad, also in controlling supplies to the extent of affecting price movements, greatly affect private enterprise in foreign markets. A statement of the significance of the support program in the international trade field was made by the Foreign Agricultural Trade Policy Advisory Committee in a report dated April 28, 1950. The statement included the following:

"One of the questions which needs to be weighed most carefully in this connection is the fact that any agricultural or other program which endeavors to maintain prices above market levels for any considerable share of the time is inevitably nationalistic. It comes into conflict with efforts

to develop international trade and other forms of international cooperation. . . .

"Such programs are nationalistic and take us back on the road to isolationism because:

". . . They increase the difficulties of exporting because prices are above those from competing sources of supply.

". . . They foster programs of export dumping which invite retaliation from other countries.

". . . They require barriers to keep products sold abroad at lower prices from returning to our markets.

". . . They encourage an expansion of state trading because of the government controls necessary in their effective operation . . .

"Our agricultural and other programs should have sufficient flexibility to make them adaptable to a constructive foreign trade policy."

This criticism is directed primarily at legislative policy. However, administrative practices can temper the effects of legislative policy. The CCC price policies and methods and channels of operation are subject, within limits, to administrative determinations as to the level of support, the extent to which subsidies are used, the prices at which supplies are sold abroad, and the methods and channels of moving products into the foreign markets.

The legislation provides, and I am convinced that the Administration intends, that the operations of the Corporation shall be an aid to the private marketing system. However, the extent of operations inevitably involves many difficult administrative problems. The holding under loan or in inventory of large volumes of commodities, and direct selling, disturb the private marketing system. Firmly established policies for operations in cooperation with the trade, including announced policies with reference to prices at which commodities are to be released, are necessary to the maintenance of private enterprise in both domestic and foreign trade. A high degree of predictability is very important to the market operator as well as to the farmer.

IMPACT OF CCC OPERATIONS UPON MARKETING AGENCIES

C. C. FARRINGTON
Archer-Daniels-Midland Company

I AM glad that the American Farm Economic Association is giving attention to the impact of government price support and other CCC activities on marketing agencies, practices, procedures and institutions. My examination of what is happening in the marketing of farm commodities, and to marketing agencies, more or less as the result of government price support activities, deals largely with grains. Those are the products with which I am currently most familiar, and I believe that what is happening in grain is rather representative of developments in all agricultural commodities, particularly the more staple and storable types of commodities. The impact of the current federal program has been felt keenly in the grain marketing business, and it has resulted in substantial changes in the character of marketing agencies and institutions.

In order that we may understand the nature of these changes, I should like to take a few moments to review some of the elementary facts about grain marketing agencies as they function in a normally free and competitive economy.

The earliest point of competition in the distribution of grain is at the country elevators. In times past the question has been raised as to the true effectiveness of such competition, and no doubt this contributed to some extent to the development of the three general types of country elevator operations encountered today: line elevators, independents, and farmers' cooperatives.

It is my observation that competition for the producer's grain among country shippers is extremely effective in maintaining efficiencies. This is confirmed by Dr. Rex W. Cox, of the University of Minnesota, in a study of 80 Minnesota cooperative elevator associations and their 1949 operations.

Dr. Cox comments: "In recent years the competition has become more intense and the area of competition expanded because of the great and rapid improvement in transportation."

Again, referring to a table in his report, Dr. Cox says: "When the radius of competition is extended to 15 miles, only one of the

associations has no competition. Twenty-eight have five to six competitors of various types, and seven have as many as nine or 10 competitors. Examination of this table calls attention again to the rather intense competition that prevails for the available grain supply."

The methods employed by country shippers to get their grain into the terminal markets vary considerably. In some parts of the country a good deal of grain is consigned in care of a commission firm. In other areas this method has almost entirely given way to a practice of selling grain "to arrive" in the terminal market by a certain date.

To the extent that merchandizers, mills, and other processors are able to serve their outlets by truck or water transportation, thus eliminating their need for transit billing on the incoming grain, they are able to take in grain supplies by truck also. In many areas this has introduced an important new element of competition, with trucker-merchants buying grain at country elevators or from farmers in producing territories and selling it direct to consuming industries.

I place this emphasis on the competitive situation for the purpose of reminding ourselves that while the free market is by no means perfect, it does bring into play such powerful forces of adjustment that the marketing system is constantly adapting itself to the true needs of consumers and producers. Margins are low, and there is a premium on efficiency.

This is well illustrated in the terminal elevator industry, in which my own company is a large operator. Normally terminal and sub-terminal storage and handling space is utilized mainly as an adjunct to the merchandizing and processing activities of the particular business. That is, the grain more often goes into storage as the property of the warehouseman than as public storage.

This again is due to the competition among warehousemen to perform certain services in connection with keeping and improving the grain, such as cleaning, separating, drying, blending, and the like. The most direct and efficient way to make full use of the plant and equipment is to buy the grain as it comes to the market, hedge it against price risk by offsetting sales for future delivery, and sell it in such quantities and qualities, or—in the case of processors—in the form of products as are demanded by consumers later on.

Each crop year skilled operators, having invested in the right kinds of specialized machinery, are presented with new opportunities to bridge the gap between producer and consumer, because each year's crop varies in quantity and quality from the previous ones, and each year presents a new pattern of consuming needs here and abroad. Thus the bidding for grain as it arrives from country points is keenly competitive, regardless of whether the price level is high or low.

The process tends to eliminate "distressed" commodities. Even the extremely low quality parcels usually are useful to some consumer somewhere, and that demand becomes effective in the competitive centralized markets.

For the very reasons that free markets are economically efficient in moving grain in space and time from producer to consumer, they are of course socially conscienceless. A truly free market is as impassive in revealing the price as is a clock in telling the time or a thermometer in indicating temperature.

From a social standpoint, the same market which is highly pleasing to some may be downright embarrassing to others. It is here that our problem becomes political.

The impact of government operations on the marketing system has resulted from decisions of the Congress to set up two social objectives for the nation.

These social goals are:

1. To guarantee purchasing power above certain levels to commercially producing farmers by transferring income from the rest of society to them by means of price.

2. To stockpile agricultural commodities at some indeterminate level considerably above normal carryovers, without depressing the price.

Whether these objectives are desirable or undesirable, whether they are practical of achievement or not, are questions beyond the scope of this discussion. I might add that so long as the price support levels are reasonable, I—and I think most of the grain trade—have no quarrel with these objectives. It would appear, however, that both of these objectives are incompatible with free markets as we have known them.

For, in the first instance, the moment price is forced to do this social task, it ceases to move freely so as to perform its function of distributing goods.

And, in the second case, the moment stockpiles of grain are accumulated, they are bound to exert a downward pressure on prices, which—if resisted—must be at the expense of the free market institution.

Now I would like to state precisely in what ways changes are occurring.

A. *At Country Elevators*

1. *Emphasis on storage*

The "handling type" of facility so common a few years ago is not adequate to meet present requirements. The opportunity for the elevator operator to buy a relatively large amount of grain during a season and move it rapidly through his house to terminal storage no longer exists. He must have enough storage space in his local house to pay a large portion of his overhead with storage revenue.

This is because the nature of the support program tends to create relatively "dead" storage of grain which is either owned by CCC, or is in positions where farmers can still decide months or years later whether to forfeit the grain to Commodity Credit Corporation on default of loans, or to redeem loans and sell the grain should the market be higher.

The differentials established by CCC between terminal and local loan values have been such as to make it generally more profitable for the farmer to store his grain in the county of origin.

Only when local storage space is all taken, will farmers ship into terminal storage, and this has introduced still another competitive factor among country elevators. In practice they tend to absorb any loan differentials, guaranteeing the farmer the same loan price in terminal storage that he could obtain in his local county.

2. *New considerations for originating business*

No longer can a country elevator operator expect *service* and *price* alone to bring business to him. Often other considerations assume major importance.

In years when farm-stored grain, held under loan, is rather generally forfeited to CCC because of price relationships, you can see that a substantial part of an entire year's business for an elevator is represented in the grain controlled by the county PMA committee.

The county committee has the power to direct the delivery of such grain to one elevator or another. Thus it may become as important to the elevator's financial welfare to know the county committee as it is to know the farmers.

This might be referred to euphemistically as a new "public relations" aspect of the country elevator business.

3. *Elements of uncertainty*

The factors which an operator must analyze and forecast in deciding whether to invest in a new plant are social-political rather than economic to an important extent.

In South Dakota, where in the one year of 1948–49 the government installed more storage capacity than the total then operated by all others, there still remains a demand on the part of government committees for more space to take care of a larger stockpile. An operator yielding to such demand and investing large amounts of capital in new facilities must assess the probability of the government-financed stockpile continuing to exist or build up in the future; he must bank on the assumption that the Commodity Credit Corporation will still contract for the use of his facilities at a favorable rate; and he must plan to stand in solidly enough with the local committee so as to be assured a share of the business and so as to be able to protect himself from direct government competition should some future administration decide to erect or purchase elevators.

All these considerations are in addition to the normal hazards and risks of the elevator business. When it is remembered that present construction costs for modern and permanent elevators are much higher than before World War II, and the normal depreciation rate for concrete elevators for corporate income tax purposes is only two percent per year, the reluctance of proprietary firms to go all out for new facilities may be readily understood. In my judgment if the government had heeded, rather than brushing aside, the request of the elevator operators for an accelerated depreciation rate for new storage structures, much larger additions would have been made by private industry with no cost ultimately to the government.

Once in the government program, a country elevator has no way of telling whether grain in storage will eventually be for sale or whether the warehouse receipts will be negotiated to CCC. After that he has no way of telling when or whether CCC will move the grain

out of his house in time for a new crop, although I am sure CCC generally has done its best to cooperate with the country elevators in this problem.

But the elevator operator tends to assume the status of a government servant, major operating decisions being out of his hands, and his welfare dependent on his ability either individually or collectively to continue year after year negotiating a favorable arrangement with government agencies.

B. *In Terminal Markets*

1. *Less merchandising, more storage*

There has been almost a complete change in the character of terminal elevator operations. Facilities of public terminal grain warehouses throughout the nation have been turned over in large measure to CCC and to farmers storing grain to take advantage of CCC loans and purchase agreements.

A survey of 368 million bushels of terminal elevator space in this country as of last February 1st showed that 69 percent of the stocks at that time were in the CCC program, and I believe this percentage would be found to be much higher than that at harvest time.

This means that, like the country elevators, terminal elevators have become government servants, dependent for their earnings on the Uniform Grain Storage Agreement with CCC. The nature of the terminal elevator merchandizing business is substantially changed by the operation of the support program. Terminal merchandizers who formerly acquired large stocks of hedged grain for merchandizing through the year now do a more or less "hand to mouth" business, with relatively small owned stocks of grain. Most of their space is filled with government-controlled grain.

Elevators, both terminal and country, presently are enjoying a higher rate of occupancy for a longer period of time than they have normally experienced. The high rate of occupancy is, of course, favorable from the standpoint of income. The greater income thus made available, however, is being offset to an increasing degree by increasing costs, particularly with regard to the keeping quality and condition of the grain. In the first place, weevil infestation is much more of a problem today than in the past. A large percentage

of the grain which arrives at terminal elevators after long storage on the farm or in country elevators is infested with weevils. In many cases this infestation is not revealed by usual inspection methods. As a result of the greater degree of infestation and longer periods of storage, elevators are finding it necessary to use much larger quantities of fumigants, and to check temperatures more frequently than has been necessary under usual operating conditions.

2. *Future uncertainties for terminal elevators*

Should a tremendous over-supply of storage space be created under the government program in country positions, followed by a change in the program because of new policy decisions, terminal elevators could face an extremely difficult situation in attempting to attract enough grain to keep them going.

Should grain tend more and more to be held by the government at country points, with so many of the storage sites being constructed off rails entirely, the direct movement of grain in trucks, by-passing central markets, could leave terminal storage high and dry.

These are but two of many examples of uncertainties of the sort that seem inevitably to develop in a governmentally controlled situation, which make it difficult for terminal operators to decide on new construction or modernization.

3. *Elimination of some marketing agencies*

Normally grain moves on its way through the distribution system by means of a series of sales and purchases. Several types of agencies, such as brokers and commission firms, depend for their existence on the fact that such sales take place. When CCC comes into possession of the grain at country points, the services of such marketing agencies are dispensed with, except as the government may decide to employ them. Their functions tend to be assumed by government employees.

To the extent that the price support program raises price levels, commissions which are based on a percentage of the price of grain are increased, but such higher rates of compensation offset only in small part the reduction in volume handled by such merchandizing agencies.

4. Taxpayers carry speculative risks

It is obvious that with government guarantees to the producer as a floor, and government sales at a minimum level above support prices as a ceiling, a large part of the speculative risk inherent in carrying the grain is borne by the taxpayers.

This, of course, has a tremendous impact on the futures markets and those agencies using them.

I hardly need labor the point that to the extent to which the government carries the risk, the mechanism of the futures market is put on the shelf. A striking example of this is afforded by the volume of trading in wheat on the Chicago Board of Trade. In the five years from 1933 to 1937 inclusive, the annual volume of trades in wheat on the Chicago Board of Trade ranged from about seven to 11 billion bushels, and averaged 8.6 billion.

With the inauguration of the wheat loan program in 1938, the volume of trading fell to about the five billion bushel level during the three years from 1938 to 1940 inclusive, and declined further to about the two billion level during the next five years. In 1947 and 1948, with controls removed and prices generally above the loan level, the volume of trading increased to about 4.5 billion bushels, but during the last two years, with prices near the loan level and large quantities being put under the loan program, the volume of futures trading in wheat has again declined.

From the standpoint of removing uncertainty, the government's speculative operation is not as helpful to a merchandizing agency as is an open and liquid futures market, for the reason that there are unpredictable government decisions which are hard to hedge against. Such decisions are unavoidable, and one often leads to another, because the price structure maintained by the government is artificial and sometimes bears little relationship to the total supply and demand situation.

The problem of the processor, on account of the seasonality of crops, is to get the qualities he needs at harvest time if he expects to get them at all. Thus he must acquire large stocks early in the year, and in a normally operating futures market he has an opportunity to hedge such purchases.

In the present situation, such hedges often do not afford him the full protection he normally expects. Instead of the futures prices reflecting carrying charges, the situation is often reversed. The markets have been inverted much of the time—that is, the

nearby futures have been worth more than the distant ones, and the cash grain has been higher still. In the case of a commodity such as wheat, where farmers participate extensively in the loan program and most of the carryover stocks are owned by the government, even though total supplies are very large, sufficient of the supply is tied up under government programs to produce a price and supply situation similar to that experienced in short crop years. In the Minneapolis market particularly there have been relatively few periods, and those of short duration, during recent years when a merchandizer could accumulate wheat and hedge it without incurring a potential loss.

These conditions have resulted, I believe, from the lack of confidence in the future on the part of everyone in the marketing system, because of the unpredictability of government action. Everyone has tended to operate on a "hand to mouth" basis, not wishing to get too far out on any limb. This "hand to mouth" basis of operating tends to bring about wide fluctuations in the cash premiums for various qualities of grain.

Normally the market carried the risk of the crop. Today the consumer carries part of it in the prices he pays, and the taxpayer carries the rest on that portion of the crop which is in the program. The farmer, who used to carry some of it, no longer does so provided he is a cooperator in the government program.

5. Away from quality, toward uniformity

Marketing agencies specializing in the preservation and improvement of quality factors in grain find the government program working against them. This accounts in part for the drastic swings in premiums as demand arises for the occasional car of extra quality barley or durum for example.

Development of quality products requires incentives for the producer to put forth the additional effort required, and for the handler to make the investment in the necessary facilities and take the pains to preserve the identity of the quality product all the way through to the consumer.

A government program, on the other hand, becomes too cumbersome if it attempts to discriminate carefully among all the variations of quality that might be desired by consumers. The CCC loan program necessarily is based on average qualities, and the CCC premiums are arbitrary differentials which, in the case of

grain at least, provide only minor incentives to producers. The CCC storage program managed as it must be by bureaus and committees, with forms and directives of general application, tends to bring about a mass handling of grain that does not permit the discriminating treatment needed to satisfy the quality buyer.

It should be noted that in some areas and for some crops the introduction of the government loan programs caused greater use of government grade standards in local markets than previously had been the case. I believe that this was particularly true for cotton. To the extent that these standards reflect value differences in quality, the cause of quality production was advanced in the early years of the loan programs.

I believe, however, it is accurate to say that any economic activity carried on by government has an inherent tendency to work away from quality and toward drabness and uniformity, because of its removal from the immediate necessity to respond to consumers' demands.

It is, in other words, non-competitive.

6. *Favorable to bigness*

Big Government in grain marketing also may have some tendency to promote bigness in marketing agencies. I believe continuance of our present system will make it increasingly difficult for the smaller firms to survive.

There are several reasons for this.

One is that the trend toward uniformity leaves less opportunity for the small operator to perform some special service or function that enables him to hold his own profitably.

Still another is that when the industry becomes largely dependent on government for earnings, with little opportunity to exercise ingenuity to increase profits, the field becomes less attractive to the individual entrepreneur.

I have seen figures quoted on Canada which may have some bearing on this conclusion. In that country the government has been dominant in the marketing of grain for a great many years. I understand that 25 years ago there were 4,208 country elevators in Western Canada operated by 82 firms, and that now there are some 5,326 operated by 28 firms; furthermore, that about 85 percent of the elevators in Canada are operated by only 10 firms.

7. Regional cooperative marketing

Without attempting to explore the subject, it is perhaps pertinent nevertheless to point out the parallel expansion of operations of CCC and regional cooperative marketing systems. Grain handled by 17 regional cooperatives in 1939–40 was 104,545,000 bushels. In 1948–49 this volume had increased to 358,950,000 bushels. The regionals' terminal and subterminal storage facilities increased from 9.3 million bushels owned and 10.6 million bushels leased ten years ago, to 82 million now.

It would be interesting to see an unbiased analysis of factors which brought about this development. I suggest this as an appropriate field of study for some graduate student working on his thesis.

* * *

Since my assignment here has been to describe the impact of the present program on the marketing institution, I have not attempted to offer any alternative plan whereby markets might continue to function freely.

I conclude, however, that the sweeping changes I have described have *not* resulted in marketing improvements. I do not see how we can help but become progressively less efficient in the performance of an economic function such as grain distribution, as we eliminate competitive forces and centralize operations in government hands. It is not my intention to criticize the way in which CCC has handled its job but to point out the weaknesses which are inherent in any mass handling of commodities by any government agency.

The adjustment forces mentioned earlier that are set in motion by freely operating competitive markets are much less effective in the present situation. The farther we get away from true prices, the more difficult are the administrative decisions that govern production, distribution, and consumption. Planning committees and administrators tend to over-correct their errors, and chaotic conditions can be prevented only through the use of force and control.

Perhaps some compromise may be found, permitting price to operate at least most of the time as a distributor of agricultural products; and, in any event, in formulating and administering

government support price programs, we should not lose sight of the many advantages that are derived from competition and free enterprise, and we should utilize them to the maximum extent possible.

DISCUSSION

GEOFFREY SHEPHERD
Iowa State College

We are fortunate to have been able to listen to O. C. Stine, with his long experience, and Carl Farrington, who has held responsible positions in the CCC and is now in the grain trade. They have presented such excellent papers that my points of disagreement are few. I will take only a moment to express them.

Mr. Stine points out that farmers' cash receipts from marketing declined only about 10 percent from 1947 to 1949, compared with 40 percent from 1919 to 1921; realized net income declined 22 percent compared with 60 percent. He says, "While the CCC operations were not solely responsible for reducing the shock, they certainly have contributed to this end." I would give less credit to the CCC. I would say that the CCC contributed only to a small extent. It seems clear to me that Uncle Sam was a far less potent price supporting factor than Uncle Joe.

I feel sorry for the brokers and commission men in the cash and futures markets who are thrown out of work because fewer of them are needed now than before. But the fewer intermediaries there are engaged in "a series of sales and purchases" the lower the costs of marketing can be. In the present case, perhaps some of the brokers and commission men can become government employees in the CCC. I would expect this to result in greater efficiency, not less.

Mr. Farrington concludes that the farmers who take part in the government program no longer carry the risk of price changes; the CCC has shifted these risks on to the consumers and the taxpayer. It seems to me that the CCC has also reduced the risk by a kind of averaging or pooling process. This is one of the things that the CCC was designed to do. The question is not whether the CCC should be thus shifting the risk from the farmer, and substantially reducing it too, but how it can do it with less disturbance to the physical grain and income allocating functions of prices and to the trade.

I wish that Mr. Farrington had addressed himself to that question at the end of his paper. Lacking his experience, I will merely suggest some leads that could be explored:

1. One suggestion has already been at least implied by both speakers. They have pointed out the desirability of using lower loan rates,—setting them, in Mr. Farrington's words, at "reasonable levels." This would make the program easier to handle all around, but would not really solve the problem unless the loan rates were lower than open-market price levels all the time; and this would render the program ineffective. So this is not a very complete solution.

2. A more promising suggestion is to reverse the present order in which prices are stabilized and storage stocks are accumulated and decumulated. At present, the level of the loan rate is the principal factor that determines how much grain will move into storage or out of it. Perhaps it would be better to reverse this procedure, and use direct government purchases and sales of grain to stabilize the price of grain, without employing loans or loan rates at all. This would get away from the direct effects of loan rates or prices, since there would be no loan rates or loans. But it would still leave the government in the grain business, for better or for worse.

   The proposal requires extensive research into such questions as comparative costs, the development of new purchasing instruments and procedures, the location of the stocks, etc. Here is a real research project in grain marketing.
3. The final suggestion is to take the government out of loans and out of the grain business and purchases entirely, except for military stock piling and livestock feed supply stabilization purposes. Farm incomes then would be stabilized not by price or purchase operations at all, but by direct income payments. This suggestion, of course, is not new. I will add a further suggestion that is new. Just as stabilizing prices by storage operations involves unstorage in short crop years as well as storage in good crop years, so stabilizing incomes should involve income deductions in high income years as well as income payments in low income years.

DISCUSSION

WILLARD W. COCHRANE
The Pennsylvania State College

Mr. Farrington has presented a thought provoking paper—temperate and well documented. He observes that important changes have taken place in the grain trade as a result of CCC stabilization operations. He concludes that these changes have not improved the farm marketing system.

It may be that improvements are not represented by the sweeping changes in grain marketing, as Mr. Farrington suggests, because of the norm which he used to judge their efficacy: namely, a highly competitive market. Perhaps the new norm is one of price making in political arenas. Here, then, a change toward currying the favor of a local PMA Committee may be good. And forecasting the acts of government assumes a greater importance then forecasting the size of the crops.

I have spent a lot of time, with little luck, trying to formulate a rationale for the pricing process which occurs in the political sphere. I would argue that price making in "political markets" rather than economic markets is here to stay unless we can construct more effective means of alleviating the income consequences of severe price changes.

I, too, am forced to conclude that where government intervenes to influence price, as in the case of CCC operations, the results in most cases are not good. And my criterion for saying that the results are not good is the following: the flow of products from producers through the distributive system to consumers is interrupted—is blocked at points along the way—to a greater degree when government manipulates prices then when it doesn't. I am assuming, of course, a mixed capitalistic system in which government is manipulating prices to modify the income consequences of

those prices. Oscar Lange, formerly of the University of Chicago, in his celebrated little essay "On the Economic Theory of Socialism" has demonstrated that a completely socialist government can use the price system to allocate resources in the same efficient manner than we find under pure competition.

I was impressed by a seemingly little point raised by Mr. Farrington—"The differentials established by CCC between terminal and local loan values have been such as to make it generally more profitable for the farmer to store his grain in the county of origin.

"Only when local storage space is all taken, will farmers ship into terminal storage. . . ." In this way the flow of grain products from producer to consumer is interrupted. And in the OPA experience we could find an infinite number of such illustrations. We all remember how meat animals ceased coming to market in the summer of 1946 in anticipation of the lifting of price ceilings.

But don't misunderstand me, I do not conclude that we do not have a price and income problem in food and agriculture. And I don't think Mr. Farrington does either, although he avoids any discussion of the motivation of CCC operations. Over the years we have a price and income problem in agriculture comparable in its evil effects to unemployment in urban areas.

I simply think there are better ways of dealing with the income problem of *commercial farmers part of the time* and of *subsistence farmers all the time* than via the price mechanism. Secretary Brannan has in my opinion taken a step in the right direction with his production payments proposal. L. J. Norton, several years back, came up with a payment type of proposal not tied to particular commodities which had possibilities. Milo Perkins and Fred Waugh long ago pointed out that food subsidies to low income consumers have important beneficial consequences for producers of food. Finally the old and suppressed proposal of the BAE of a Conversion Program for the Cotton South went a long way in the direction of developing an income support program for agriculture outside the pricing system. And that is what I want—an income support program for agriculture which does not interfere with the essential integrating role of prices.

Dr. Stine states that the press has greatly exaggerated the losses (or potential losses) of the CCC in the past several years. This is an assertion that can be neither proved nor disproved. The Korean crisis (and what may follow) will probably pull the CCC out of the red. But its fate might have been very different if permanent peace rather than limited war were the prospect for the 1950's. Once again war turns out to be the solution of the surplus problem and the savior of the CCC.

Dr. Stine suggests that the consumer has not been overlooked. True, total food output has increased and per capita food consumption has increased over the period 1933–50. But the great expansion in food output between 1937 and 1944 is more closely associated, in my opinion, with the increased demand of that period than with the price raising influences of the CCC. And many of us suspect that we as a nation could have, partially at least, eaten our way through the surpluses which accumulated in 1948 and 1949, if the CCC had been less active and prices had been lower. Thus

I conclude that the operations of the CCC in supporting farm prices can by no stretch of the imagination be considered a consumer program.

My last point is concerned with the delicate operation of the pricing system once again. Dr. Stine's butter illustration complements Mr. Farrington's wheat illustration and adds fuel to my argument that the pricing system does not lend itself to income supporting actions.

Dr. Stine states, and I assume the facts to be correct, that the failure to provide for a seasonal pattern of price support for butter has interrupted the regular flow of butter through the distributive system. I repeat, if you tinker with one price to enhance the incomes of the producers involved, you are driven to "adjust" the price of a second product and so on through the chain of substitutes in order to keep products moving.

THE ROLE OF MARKET NEWS IN MARKETING AND SOME PROBLEMS

KENNETH J. MCCALLISTER
Production and Marketing Administration

THE role of market news in marketing, quite simply, is to aid the free competitive marketing system to do its job better and at lower cost.

Why a free competitive society needs market news has been well stated by Sumner Slichter of Harvard. In his book, "Modern Economic Society," he says,

> "Upon a myriad of decisions concerning what to buy and what to sell, and at what prices to buy or at what prices to sell, made by millions of individuals, depends the working of the economic order. If these decisions are made wisely and on the basis of reasonably complete and accurate information, the system of free private enterprise may work fairly well. But naturally, the operation of the system cannot be better than the decisions of those who determine what it does. If these decisions are made by men who are ignorant of the relevant facts or who do not know how to interpret them, we must expect industry to act as if it were guided by ignorant men. . . . It is of basic importance, therefore, in improving the operation of free private enterprise, to make accurate and comprehensive market information constantly and easily available to all buyers and sellers. Not until this is done, not until it is possible for individuals to buy and sell intelligently, can we expect free private enterprise to work satisfactorily—as if it were directed by men of good judgment."

The marketing job in our economy makes up an important part of our total national effort, and if it is to be carried out most effectively by free private enterprise, there are several basic requirements to be met:

First, *all buyers and sellers must be equally and adequately informed.* This is necessary if we are to put our trust in competitively established prices as our measure of economic value.

Second, *there must be honesty in market dealing,* for without honesty, the system is encumbered and its results distorted. When cheating exists in marketing, either the farmer suffers through reduced returns, or the consumer through higher prices, and those engaged in marketing may be hurt too.

Third, *there must be prompt, intelligent, responses to changing market conditions.* This is necessary if prices for individual commodities are to be kept in line with changing supplies and market demand; if available supplies are to be so distributed among the consuming centers as to

bring the greatest return; and if there is to be coordination in pricing among all levels of trading—at the farm, at wholesale, and at retail.

Market news is able to contribute to all three of these requirements:

As to the *first* requirement, that of buyers and sellers being equally and adequately informed, the information which the private and government market news reporters throughout the country are able to collect is much more complete than any one individual could possibly collect for himself and it is equally available to both buyers and sellers. One thing, of course, that market news cannot do is to insure that the information will be used with equal intelligence and skill by both the buyers and sellers who receive it.

As to the *second* requirement, market news contributes to honesty in marketing because the government reports are publicly available, and thus they limit opportunities to make false returns or to deceive through misrepresenting market conditions. For example, buyers and commission men know that the farmers to whom they are making returns can and do compare their sales slips with the market news reports.

As to the *third* requirement, that of prompt intelligent responses to changing market conditions, market news provides timely reliable information to those making the marketing decisions. The quantities of individual agricultural products that move to market vary much more than do the quantities of manufactured goods; therefore, a greater burden and responsibility is placed on the marketing mechanism promptly to clear up gluts and adjust to supply deficiencies. Market news assists farmers and shippers to locate quickly the most advantageous places to sell, and it aids buyers in discovering the best localities in which to buy. By reporting on shipments and their destinations as they leave the producing areas, and on supplies in the markets, it provides a basis for intelligently directing shipments to market and of making diversions en route. Moreover, if our marketing system is to be truly effective in promptly reflecting values and guiding distribution, the price adjustments required by changing supply and demand must be made as nearly simultaneously as possible at all levels of trading—at the farm, at wholesale, and at the retail level. As an example, the accumulation of supplies at the farm, or anywhere along the marketing pipe lines, may force sharp price

concessions from the farmer, but until these price concessions are reflected in retail prices, the volume of sales to consumers is not increased, and the glut is not relieved. Likewise, the pricing mechanism becomes handicapped in returning higher prices for short supplies at the farm unless these higher prices can be quickly established at the wholesale and retail levels. To the extent that market news reports are available for each level of trading, the coordination of price changes at the different levels is facilitated.

Market news also provides important means of reducing marketing costs. Let me mention some:

1. Through its reports market news reduces uncertainty, hence lowers the cost of risk assumption involved in buying, selling, and owning agricultural products as they are moved from the farms through to consumers.
2. Market news—particularly when used in connection with recognized grades—reduces the amount of physical handling and time required to move many of the farm products from farm into consumption. It does this by facilitating trading between buyers and sellers located at distant points. Such trading avoids the alternative costs of moving farm products physically to some central point of concentration—say, a terminal wholesale market—in order that buyers and sellers, or their hired representatives, may meet together, dicker over prices, and then engage in the process of redistributing the products. Under most conditions, it is much cheaper to transmit the necessary information needed in trading than it is to bring the commodities and all the buyers and sellers together. The growth of commercial trucking has greatly expanded the opportunities for this type of trading and the direct movement of farm products into consumption.
3. Perhaps the greatest of all opportunities for market news to reduce marketing costs is through the maintenance of a constant pressure of enlightened competition on all the individuals involved in marketing. For it is only when informed sellers and buyers—particularly, informed farmers and consumers—put competition among middlemen on a performance basis that we can expect much progress in putting improvements in marketing into effect. Our experience under free enterprise, I think, will bear me out—that whether it be building material for war or improving some peace-time service, a strong pressure for performance usually gets results.

   If through market news reporting at the different levels of trading, competition among middlemen were put more directly on the basis of the efficiency with which they do their jobs, we could expect many of them who may have remained in business solely because of ignorance on the part of those from whom they buy or sell, to be either gradually displaced by the more efficient marketing operators or to become more efficient themselves. I would like to emphasize this

point because of the wide differences in marketing charges that are made for comparable services, and consequently the opportunities that exist to work some of the higher charges downward through competition under conditions where farmers and consumers give their business to those marketing men who most deserve it. The wide difference in charges made by retail stores is particularly impressive. Data gathered in Baltimore since January of this year showed that those prices gathered for fresh fruits and vegetables which fell in the lowest 10 percent of the retail price range averaged 46 percent over the average wholesale market price, while those retail prices in the highest 10 percent of the price range for the same fruits and vegetables averaged 97 percent over the average wholesale market price. Naturally, some differences should be expected for services and convenience, but hardly the amounts found. Among stores in Baltimore of the same type and approximate size and offering the same services, it was found to be quite common for some stores to charge a 30 to 100 percent wider margin for handling certain commodities than was charged by others.

The extent to which the Market News Service is able to contribute in any of these ways I have mentioned—equally and adequately informing all buyers and sellers, encouraging honesty in market dealing, and providing the means for prompt, intelligent responses to changing market conditions—depends upon the completeness of the marketing information that is available, and on its accuracy, and its timeliness. Market news, however, cannot possibly supply every kind of information to everyone wishing it in exactly the manner they would like to have it. Therefore, decisions must be made as to how the funds that are available for government market news reporting are to be allocated among the jobs to be done and, in the case of the private reporting services, decisions must be made as to what information can be sold most profitably. Naturally, the desire in government market news reporting—either federal or state—is to fill the most important needs first.

The first chart below—pending the outcome of research in some of the areas—shows those areas of activity or potential activity where the Federal Market News Service now believes special attention is needed. (See Figure 1.)

A substantial expansion is needed in the reporting of information in the producing and shipping areas if the Service is to be kept up to date with increased direct trading between producers and processors and distributors.

The reporting of truck movement is certainly very much needed and is a big job with very little reporting now being done.

The improvements needed in the reporting of wholesale trading in the terminal markets are primarily to strengthen and better present reporting.

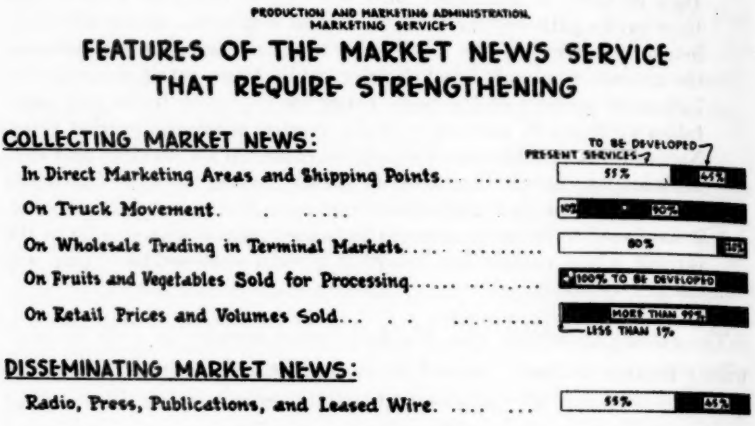


FIG. 1.

A large part of the fruit and vegetable crop, particularly in certain areas, is either canned, frozen, or dried, and only very limited marketing information on fruits and vegetables for processing now exists.

Some retail reporting is now done by the Federal Market News Service on meat in New York, butter and eggs in Chicago; butter, eggs, and milk in San Francisco and Los Angeles; and on butter in Seattle. But whether or not further retail reporting should be undertaken is still an open question—to be decided in part by the outcome of research work now under way.

Dissemination problems need to be given special attention, especially because of the growing importance of radio in market news work. Also, certain improvements are needed to increase the efficiency of the nationwide leased wire system used to transmit information among the Federal and State market news offices, and more needs to be done in the preparation of market news material for public release.

In three of these areas needing attention: (1) reporting in producing areas, (2) reporting of truck movement, and (3) retail market

news—pilot market news studies have been undertaken with Research and Marketing Act funds to develop methods and test uses of marketing information.

The producing area market news pilot study was directed at the problem of reporting butter in Iowa. There, as is the common practice for the majority of creameries throughout the Midwest, the creameries sell their butter largely without grading, based on commercial market quotations in central markets, with discounts, premiums, varying shipping returns, and special concessions. The individual creamery managers or boards of directors have no means of comparing the adequacy of their individual creamery's returns with other creameries in the same area, and therefore they have no informed basis for making the only marketing decision in which they engage—that of deciding to whom to sell.

This pilot service was undertaken to test the practicability of filling that need by reporting on the prices received for butter by Iowa creameries by grades. The butter was graded by a federal inspector at the creameries, and the creameries, in turn, reported the prices they received to the market news office in Des Moines. The study is not yet complete, but the reports issued on the basis of information gathered have shown important differences between prices received in Iowa and those reported in the terminal markets. For example, from September 1949, when the pilot reporting began, through July 1950, the New York commercial quotations for grade A butter averaged 1.2 cents per pound over grade B, and in Chicago, 1.6 cents over grade B. In Iowa, however, during the same period grade A butter actually only returned to creameries slightly less than one half cent per pound over grade B butter. The weekly range in prices received by Iowa creameries for grade B butter averaged 2.5 cents a pound, indicating very little concerted agreement as to the value of butter in Iowa. This compared with the weekly range in price for B grade butter in New York of only 0.5 cent a pound. When we subtracted average shipping charges from the New York quotations we found that Iowa prices for B grade butter were consistently higher, and averaged one cent per pound over the New York quotation. An Iowa creamery manager following only the New York quotations might feel he was receiving good returns, whereas actually he might be receiving substantially less than most other creameries.

The pilot study on reporting truck movement has been carried

on in the reporting of truck shipments of fresh fruits and vegetables by the USDA Fruit and Vegetable Market News Service. The reporting of rail movement has always been a part of the Market News Service, but now that 40 to 50 percent of all fresh fruits and vegetables are transported by truck, information on both rail and truck movement is needed to get the complete picture.

The problem of reporting truck shipments is quite different from that of reporting rail movements. Information on rail movements is obtained directly from the railroads themselves, which have highly organized systems for rapidly tabulating and reporting their movements. The trucking of fresh fruits and vegetables is largely unorganized, and is done primarily by a multitude of small operators—the vast majority of whom maintain no records which could be used in a national system of current reporting. In the truck movement pilot reporting that has been done, it was found that truck movements out of Florida, California, Arizona, and the lower Rio Grande Valley of Texas, could be obtained from existing state road block passing systems set up for pest control and regulatory purposes. In those local shipping areas where most of the products are inspected, the Federal-State inspection service was able to provide reports on truck movement. In those areas where a majority of the products move through farmer markets or country auctions, these concentration points provided a good source of information. In other areas it was necessary to rely on direct contacts with shippers by telephone. In general, the pilot study experience has been that by using these methods or a combination of them it is practical to report daily truck shipments on a fairly complete basis in the more distant shipping areas. For those shipping areas nearer the consuming centers, however, keeping track of truck movements was found to be much more difficult, and no feasible method of reporting this nearby movement has been discovered.

To test the practicability of retail market news, a pilot service is being carried on in Baltimore in which prices on approximately 125 agricultural food items and volume of retail sales information on 40 items are gathered. Although the end goal in production and marketing is the retail sale, only limited market news reporting has been done at the retail level. Some private agencies collect information on volume of retail sales for a select group of com-

modities, but the fees they charge for the information are so large as to exclude any but the largest operators from using it. Some of the states—Rhode Island, Massachusetts, Maryland—and the city of New York, collect retail prices which they distribute to consumers as a guide to "best buys."

Preliminary results from the Baltimore pilot study indicate some serious limitations to the reporting of weekly volume of retail sales. The sampling errors in estimating weekly sales volumes for most commodities were found to be larger than the estimated week-to-week change in sales. Some improvements are to be had by extending the reported time period on volume of sales to a bimonthly or quarter-year basis or by expanding the sample size, which would add to the cost; but it seems likely that the best approach to estimating the volume of retail sales for most commodities would be to obtain deliveries to retail stores from distributors and then to supplement this information with reports on retail store inventory changes for those commodities on which such retail store inventory changes are likely to be significant—such as canned goods.

In contrast to reporting retail volume of sales, the reporting of statistically significant retail prices was found to be quite easy. The question that remains to be answered in reporting retail prices is not whether they can be accurately reported, since it has been determined that they can be, but whether such reporting in major cities throughout the country would be worthwhile. Studies are now being made as to the uses to which the Baltimore pilot retail price reports are put by consumers, storekeepers, distributors, and producers.

The retail prices that have so far been gathered in Baltimore indicate that there are some realistic opportunites for a better job of pricing at the retail level, at least from the farmer's and consumer's point of view, and I strongly suspect from the retailer's long-time point of view as well. One of the apparent needs is for a better coordination between retail and wholesale pricing. To illustrate, the second chart below compares prices for No. 1 yellow onions at retail and wholesale in Baltimore for the period December 1949 to April 1950. (See Figure 2.) The wholesale prices broke in January because of large stocks on onions in storage and the prospects of a large crop of new onions coming to market in May. Starting when the wholesale price first declined, there were

just 15 weeks remaining in which to move the onions on hand into consumption. Three weeks, or one fifth of that time, was taken up before the retail stores made any price adjustment. Then there was a three-weeks lag in making the second retail price adjustment, and five weeks elapsed before retail stores made their third adjustment. No retail price adjustment was ever made to

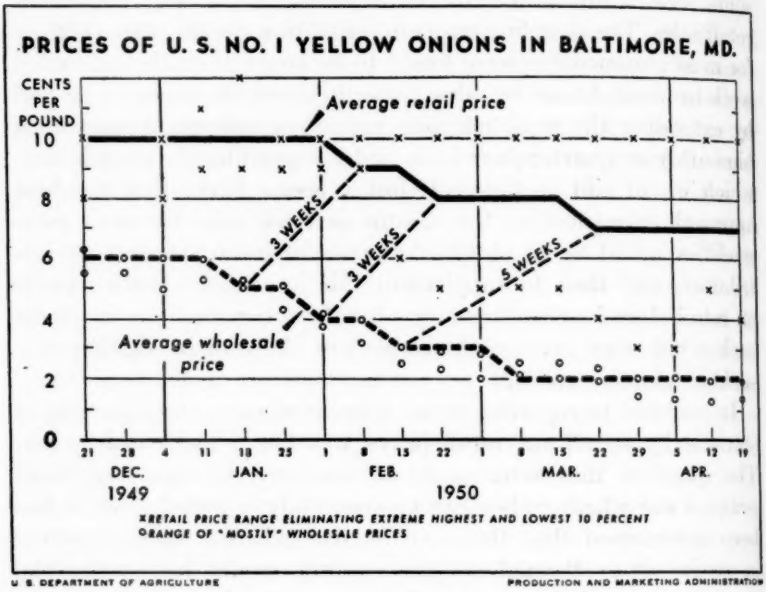


FIG. 2.

the fourth drop in wholesale prices. Notice that in December the difference between the wholesale and retail prices was four cents per pound or 40 percent of the retail selling price, and that in April the difference was five cents per pound or 70 percent of the retail selling price. The x's on the chart show the range in retail prices. Notice that some stores made no price adjustments—keeping their prices steadily at 10 cents per pound; that these stores represent an important group as can be seen by their relationship to the average price line which lies somewhat closer to them than to those at the bottom of the range; also, that these stores apparently could have done a much better job of keeping their prices in line with wholesale changes as is demonstrated by the adjustments made by those stores at the lower end of the range. There was some

lagging, even among these stores at the bottom of the price range, but these stores did keep themselves fairly well in line with wholesale market prices. We found that in general the stores adjust their retail prices to increases in wholesale prices much more quickly than to decreases.

In reporting retail prices for large grade A and B eggs we found that the retail stores tended to maintain a fixed price differential of about eight cents a dozen between the two grades in spite of substantial changes in the relative supplies of the two grades of eggs at wholesale. As a result, consumers in the city were not given an opportunity to respond to the wholesale price changes so that the supply-demand situation between grade A and grade B eggs could adjust itself. Instead it was aggravated and distorted to the extent that in October 1949 grade A eggs were selling at wholesale for 15.5 cents a dozen over grade B eggs, and in March 1950 they were bringing only 2.5 cents a dozen premium over grade B eggs.

In reporting meat, we found that the retail prices for pork moved up right along with the wholesale prices of pork carcasses from January to August 1950, and that the wholesale-retail difference held fairly steady at 14.5 cents a pound. Then starting in April the retail prices for beef went up right along with the retail pork prices, although beef wholesale prices went up only slightly. The average wholesale-retail differential for beef increased from 25.6 cents a pound in April to 32 cents a pound in August. There is no reason to believe that the cost of retailing beef went up during this period while the cost of retailing pork did not. Yet this extra marketing charge on beef was made, and when multiplied by pounds sold in the city, it amounted to an extra marketing charge of approximately $1.2 million.

In reporting butter sold in Baltimore (most of which is grade B and comes from the Midwest) we found that the retail price held steady, even though from February to May and June the price received by Iowa creameries for grade B butter dropped nearly five cents a pound. As a result, there was no incentive for consumers to increase their consumption of butter, and no contribution was made toward relieving the supply situation in the producing area. As a result, the lowered prices to creameries were continued longer than they might otherwise have been. Because terminal market wholesale prices for butter moved down with the Iowa price decline, the only apparent result of the price concession

taken by the creameries was a higher average profit to the retailers. This extra marketing charge on butter from February through June amounted to $115,000.

From these examples, and other experiences in retail market news reporting, it seems to me that much of the competitive effort in retailing, from the producers' point of view at least, is misdirected in the sense that while the methods of retail pricing and other competitive devices used may be effective store against store, they do not always suffice to insure that the retail margins taken for individual farm products are even approximately close to the actual cost of doing the job of retail handling, displaying, and selling the product in question. If it is found, through the research being done, that retail market news reporting can help to redirect this competitive effort at retail so as to keep the retail marketing charges for individual commodities more nearly in line with actual costs, even if only to a slight degree, then such a service would pay for itself many times over.

All of these illustrations of areas of research into market news reporting methods and the uses of market news deal with the continuing problem of gradually expanding our knowledge of how to improve and make more effective use of this valuable marketing tool. The suggested possibilities of increased usefulness do not, of course, imply that market news has not already proven itself as a valuable marketing aid—this it does over and over again each day to the thousands who use its reports. What these possibilities of increased usefulness do confirm is that market news must constantly grow and develop if it is to keep pace with our marketing system and the society it serves.

THE INFLUENCE OF THE FEDERAL FOOD AND DRUG ADMINISTRATION IN MARKETING

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THE Food and Drug Administration of the Federal Security Agency administers the Food, Drug, and Cosmetic Act passed in 1938. This Act represents a rather complete revision of the Food and Drugs Act of 1906.

In general, the 1938 Food, Drug, and Cosmetic Act is intended to prohibit the interstate movement of adulterated and misbranded foods, drugs and cosmetics. Under the Act reasonable definitions and standards of identity, reasonable standards of quality and reasonable standards of fill-of-container may be promulgated within certain limitations and following certain procedures.

In general terms, food is deemed to be adulterated, among other things:

1) If it bears or contains any poisonous or deleterious substance, which may render it injurious to health.
2) If it bears or contains any added poisonous or deleterious substance which is unsafe.
3) If it consists in whole or in part of any filthy, putrid or decomposed substance or if it is otherwise unfit for food.
4) If it has been prepared, packed or held under insanitary conditions whereby it may have become contaminated with filth or whereby it may have been rendered injurious to health.

Among other things, a food is deemed to be misbranded if the labeling is false or misleading in any particular or "if in package form unless it bears a label containing:

"1—The name and place of business of the manufacturer, packer or distributor—

"2—An accurate statement of the quantity of the contents in terms of weight, measure or numerical count. . . ."

Under this last weight clause there is provision for reasonable variation.

Generally speaking, there can be little doubt but that the purposes of the Act are reasonable and enforcement advantageous from the standpoint of the public and from that of affected in-

dustries. My assignment, as I interpret it, is not concerned with the philosophy of the Act but rather is restricted to the effects or role of the Act from a marketing standpoint.

In viewing the effects of the Act one general fact which stands out is that the establishment of standards of identity for foods and the limitations regarding adulteration and branding are restrictive in nature. One result will usually be that of increasing processing and marketing expense, although, under some circumstances, increased efficiency may result and expense be reduced. A few examples may serve to illustrate these points.

In the field of standards of identity or definitions, let me refer to Cheddar cheese, a food for which a standard of identity was promulgated in 1939 under the provisions of the 1938 Act. That definition provides, among other things, that such cheese contain not more than 39 percent moisture and not less than 50 percent butterfat on a dry matter basis. Now, it was probably true that, prior to the promulgation of such a standard, Cheddar cheese usually contained not over 39 percent moisture and not less than 50 percent fat, this common practice having resulted from economic considerations involving manufacturing methods, curing results, and consumer acceptance. However, moisture might be as high as 40 percent or 40½ percent as well as going under 39 percent, and fat may easily have been 48 percent or 49 percent rather than 50 percent. But, with the promulgation of specific food and moisture limitations, direct liability is attached to the shipment of Cheddar cheese exceeding the prescribed moisture limit or falling below the prescribed fat content. The product, if containing moisture above 39 percent or fat less than 50 percent, may be seized and the manufacture or owner prosecuted.

Manufacturers, processors, and handlers were therefore immediately faced with the necessity of protecting themselves against such seizure or prosecution. Usually such protection means laboratory testing for fat and moisture on the part of the manufacturer, similar testing or the protection of a guarantee on the part of the handler, and a guarantee and testing on the part of the processor. This processor difficulty arises because once the particular lot of cheese is blended or mixed with other lots in processing, the entire blend or mixture would be subject to seizure. It is clear that the added precaution means added expense.

In the adulteration field an example may be taken of cheese

made from milk containing foreign material. Such cheese if shipped in interstate commerce may be seized and the shipper prosecuted. Naturally, under such circumstances the cheese buyer is going to attempt to ascertain that such cheese is legal from every standpoint. The result is added inspections, such as sediment tests, bacteria counts and the like in receiving producer milk, probably farm inspection on the part of the manufacturer, and added precaution on the part of the cheese buyer in seeing that reasonable caution was used on the part of the manufacturer. Again, this latter may take the form of guarantees on the part of the seller and purchaser inspection of the manufacturing plant, including the milk supply. Once the form of the product covered by the guarantee has been changed, however, as in processing, cutting, or re-packaging, the guarantee no longer holds. Therefore, most large users of cheese in processing or cutting are checking manufacturing plants for sanitation and the kind of milk used by the manufacturer. Immediately added expense is entailed.

In this connection a particularly difficult problem is that of determining the precise point at which milk becomes adulterated, or the precise dividing line between cheese "produced, packed or held" under sanitary conditions and cheese not so "produced, packed or held." General observation leads to the conclusion that these matters are relative; probably "sanitation" for example is a shifting concept. In any event, interpretation becomes a matter for each manufacturer, shipper, or processor.

In the case of misbranding it is to be noted that a food product is misbranded, if among other stipulations " . . . in package form unless it bears a label containing . . . an accurate statement of the contents in terms of weight, measure or numerical count . . . ." Prior to February 28, 1939, individual cheeses of the brick and Limburger types and individual imported Roquefort cheese wrapped in tinfoil and parchment paper were exempted from the net weight declaration requirement. This exemption was apparently based on the contention that those cheeses "were not in package form because of their invariable sale by the pound and not by the unit and that the paper and foil used were an integral part of the cheese" (Service Regulatory Announcement, Item 292, issued October 9, 1918, under the Food and Drugs Act of 1906). As the result of a later administrative determination that such cheeses "are properly classified as food in package form under the Food, Drug and Cos-

metics Act of 1938" it became necessary that each label on each such cheese carry a weight declaration. Practically this meant, in the case of certain of these cheeses, the special weighing and marking of each individual piece. In addition to the necessity of weighing each piece, in the case of many companies, this decision also entailed a revision of labels—not an inexpensive item.

From a somewhat broader standpoint it is quite possible that the operation of such a law as that under consideration may in part cause changes in the entire pattern of an industry. An illustration, not directly a food and drug matter but one which has a counterpart in the food and drug field, is at hand in the case of fluid milk. It may be expected that 30 to 40 years ago there was little or no formal inspection of milk used for distribution as fluid or bottled milk. The introduction of standards involving farm inspection and receiving station inspection not only had the effect of increasing the necessary supply price of the product, but probably also resulted in more standardized milk production units of a larger size.

Smaller producing units tended to disappear, since alternative farm enterprises promised relative returns or since it did not appear worthwhile for the small unit operator to make the necessary improvements or changes. To some degree this same tendency seems to have appeared in dairy farms as a result of Food and Drug requirements regarding the use of milk and cream in manufacturing dairy products.

Milk manufacturing and receiving plants appear to have been affected quite definitely. Necessary remodeling or repairing in the case of some plants in order to meet sanitation requirements apparently has not been justified economically in view of the volume of milk available. As a result there has been a tendency for such plants to close, a trend intensified in some cases by other related factors. For example, starting in 1943–1944, some states require that cheese sold shall have been made of pasteurized milk, the cheese itself pasteurized or the cheese aged for at least 60 days. A similar requirement is now under consideration by the Federal Food and Drug Administration as a part of the proposed standards of identity. In view of these developments there has been a rather rapid shift to the manufacture of cheese from pasteurized milk. In some cases such a shift requires not only pasteurization equip-

ment, but the addition of such things as increased boiler capacity and even a larger water supply. These items added to possible building remodeling, in some cases, have caused plants to close.

Likewise, the number of cream stations has been declining. While this reduction perhaps may be attributed partly to a decline in total cream deliveries, undoubtedly the more stringent food and drug requirements have been an important factor in bringing it about.

On the other hand, regulations of the type indicated, while doubtless adding expense, at the same time may narrow the field of competition in the sense of limiting the variables open competitively and may in the end mean larger volumes and reduced expenses.

Cases may be cited where industry competitive practices have probably been such as to reduce consumption and increase certain per unit expenses, although per unit ingredient costs may have been lowered. Frequently, such practices are introduced by only a few members of the industry. I am told of one industry which at one time enjoyed a substantial volume of business. However, the product was such that the flavor, keeping quality, and nutritive value were impaired by the increased use of relatively cheaper ingredients, normally present in controlled amounts, while the appearance of the product was unchanged. As a competitive measure some manufacturers resorted to increasing the amount of the cheaper ingredients. The result was consumer reaction resulting in the reduction of the total quantity sold. During the wartime shortage this type of cheapening of product was probably quite common. The after effect is not so clear, but from observation I believe that, in the case of certain cheese products at least, consumer demand was adversely affected. The result was undoubtedly obscured however because of a general tight cheese supply situation.

Another direct industry benefit is the obviating of widespread adverse publicity and decreased demand resulting from the harmful consumption of certain products mishandled or made of faulty ingredients. The entire industry might otherwise suffer volumewise, having as such no means of protecting itself. Both standards of identity and enforcement of adulteration provisions have undoubtedly been very helpful in these cases.

Another point where Food and Drug activity has benefited industry, though there may be added expense involved, is in connection with product quality.

In the case of milk products, many of you are aware of the fact that in practically every state, industry and extension representatives have for years fostered milk, cream, and dairy product quality improvement programs. Presumably, the primary basis for such programs is that better quality milk, cream and dairy products mean increased demand. Some of the factors involved in the quality programs are the same which come under the heading of adulteration. Food and Drug activity on this front have definitely helped these quality programs.

In summary, it appears clear that Food and Drug activities undoubtedly are a factor of importance in marketing. Those activities not only affect unit expenses and the area of competition but may also influence the structure or pattern of industry. There are many other areas that are also affected which have not been covered by this paper.

CENTRAL MARKET QUOTATIONS AND COUNTRY BUYING

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CENTRAL market quotations provide a basis for settling trades at country points in cotton, cheese, poultry and eggs, butter, and sometimes other products.[1] There are important differences in the way quotations are used in these industries, and in market reporting for them. I shall discuss some of the problems in the use of central market quotations for pricing at country points, with particular reference to butter.

I use the term "quotations" to include any wholesale price employed as a basis of settlement, whether U.S.D.A. daily price reports or prices from private reporting agencies. The term originally referred to prices reflected by Exchanges. The major central markets for butter are New York, Chicago, and San Francisco, where the principal Exchanges are located. Seattle and Philadelphia are sometimes included in this group. The two quotations most often used for settlement in Wisconsin are the Chicago Price Current, and the Dairy and Poultry Market News report for Chicago.

My primary data come from the preliminary tabulation of a survey of butter pricing at country points in Wisconsin, carried out as part of a cooperative project with the Agricultural Experiment Stations in the North Central region and the U. S. Department of Agriculture.[2] The objective of the regional study was to examine the methods by which prices were established for butter at country points and central markets, to appraise their adequacy, and to suggest ways of improving them.

The problem grew out of the effects of decentralization in the butter industry, noticeable even before the turn of the century. It became important as an increasingly large proportion of butter was bought from factories and traded throughout the marketing process on the basis of contracts naming a central market wholesale quotation as a basis for settlement. Meanwhile, the growth of

[1] U.S.D.A. Misc. Pub. No. 703.

[2] Robert Pelley, Graduate Assistant, Univ. of Wisconsin, assisted in the field survey of Wisconsin creameries.

direct selling was leaving a progressively smaller amount of butter to be traded at wholesale in central markets. Thus a major part of total production was settled for on the basis of market quotations arrived at on a relatively small amount of trading.

The basic elements of this problem are the same as those studied by Sprague[3] and by Quintus[4] in 1939. Since then the U.S.D.A. has broadened its coverage and now reports a range of prices rather than an average price; the volume of exchange trading, both spot and futures, has decreased partly due to government price support; and the volume of all wholesale trading in the central market has further declined.

The regional data from this study are not yet available. At the present stage of the study I can offer little more than a progress report from the preliminary Wisconsin data and previous literature in the field. I shall explore some problems, but shall not present a finished analysis. I shall cite the criticisms usually heard of country point pricing of butter, examine the basis for these criticisms, list and comment on some alternatives to the present methods of pricing.

A combination of features distinguishes butter trading from that of other farm products at the factory level. Some of these are: (1) Butter is produced the year round and in widespread areas. In this respect it differs from fruits and vegetables, for example. (2) Producers of butter usually have regularly established outlets for shipments which they make frequently and at regular intervals. The country shipper of butter therefore differs from the livestock shipper who ships intermittently and to any one of several receivers or markets. (3) Butter is commonly sold under some form of agreement with a receiver who names a market quotation as a basis of settlement rather than a dollars and cents price, thereby differing from methods of sale for many farm products.

The details of this agreement typically provide that a portion of the butter produced by the creamery will be purchased by the buyer at a specified wholesale price quotation, plus a premium or less a discount. Of the shipped butter from Wisconsin plants that sell their own products, usually 75 percent or more goes to regular buyers under some sort of an agreement naming a quota-

[3] Gordon W. Sprague, *Butter Price Quotations at Chicago*, University of Minnesota, Ph.D. thesis, 1940.

[4] Paul E. Quintus and T. G. Stitts, *Butter Marketing by Cooperative Creameries in the Middle West*, F.C.A. Bulletin No. 36, 1939.

tion. The contract usually designates the receiving point, and who is to bear the freight and cartage costs. Although the price offer usually designates a score as a basis for pricing, there is typically no provision for grading. A factory with high average quality would seldom be docked for occasional failure to meet the designated grade. Most factories never know their scores on basis of any widely accepted standard unless they sell to the government or to Land O'Lakes, except for occasional certificates from the State Food and Drug inspection staff. However, buyers do report the grade used as a basis for pricing and in many cases would furnish a federal grade if requested.

Sales from primary receivers to their outlets, i.e., jobbers, retailers, or others, may be open market sales where the selling prices are agreed upon at time of sale, or may be transactions under previous contractual arrangements for a fixed price differential from some recognized commercial quotation used as a base. As I understand it, even the open market sale may not be stated in dollars and cents, but instead the price may be stated in terms of the quotation. In a general way, this describes the role played by quotations throughout the butter marketing process.

How are the central market quotations in Chicago made up? Butter shipped to regular buyers from Wisconsin creameries which market butter individually is usually priced on Chicago quotations. The Chicago Price Current quotation, privately published, is used by an estimated 85 percent of Wisconsin creameries which use the Chicago quotations in this manner. From interviewing the publisher and from attempting to analyze the report, we get the impression that the Price Current historically has depended chiefly on the Chicago Mercantile Exchange. Now that so little activity is shown on the Exchange, this report has become essentially a market opinion or judgment estimate from Exchange trading. When no sale occurs on the Exchange, a price is arrived at through weighing bids and offers in light of the tone of the market, or carried over from the previous sale. Prices for individual grades in the absence of sales may be arrived at by using differentials most recently established through Exchange trading. This quotation is issued about 10:15 A.M., and is based on the day's trading up to that time.

There have been times since the Exchange was established when trading on the spot call was quite active, and when this was true,

the Price Current quotation had certain desirable characteristics for use in contract pricing. Namely, it represented widely accepted grades with known amounts of services, owing to the effect of Exchange rules for the spot call.

The market news daily price report is used by a few of the larger plants in pricing arrangements for butter they ship to regular buyers. It is used much more often in pricing local sales. This is a report of wholesalers' selling prices, and is not intended for use as a quotation. The market news price reporting was originally based on wholesale open market transactions including Exchange sales. But within the last decade, as the volume of wholesale business declined, methods of reporting have been adapted to changing market practices. In earlier years business on a commission basis was common, and provided a closer measure of price-quality relationships than most transactions in the marketing process. Information covering a relatively large volume could be obtained from a few wholesale commission merchants to supplement the Exchange price. In more recent years this type of transaction became less representative as jobbers arranged for butter supplies at country points, wholesalers arranged for printing and outlets with retailers, and both tended to adopt the practice of settling with shippers at an agreed differential in relation to a designated wholesale quotation. The practice of pricing on basis of quotations disappeared for a while under the administered pricing of O.P.A., but the movement toward more direct marketing was speeded up.[5]

The Market News Service regarded this (1943) as an opportune time to broaden its coverage to include all types of wholesale trading by first receivers in central markets as well as open market transactions, and to exclude only those sales involving long-time credit or unusual services and sales for delivery outside the city. With the broader coverage, the market news price report began to show a range, whereas it formerly showed one price. Because it is not intended as a quotation, this price does not provide details on packaging or other services included. Perhaps the two chief reasons why the Chicago trade chooses to use the Price Current in their dealings with Wisconsin plants is that they prefer a single or specific price to the range reported by Market News, and that

[5] L. M. Davis, *Wartime Quotations on Dairy & Poultry Products*. November, 1943, p. 4 (mimeographed).

they prefer a report issued early in the day. The Market News report is issued in mid-afternoon, about 2:15 P.M.

Criticisms Usually Heard of Country Point Pricing of Butter

Criticisms usually heard of the present methods of pricing butter at country points may be grouped as those directed at the method of pricing, and those aimed at the quotation itself questioning its value as a basis for pricing. These could be viewed as hypotheses formulated by different observers who regard the butter pricing at country points as unsatisfactory.

Those who question the method of pricing are inclined to the view that the use of quotations with the attendant premiums and discounts is bad, that country plants should price individual shipments of butter on the supply and demand situation for the industry on a dollars and cents basis. They also say that use of agreements is bad, their reason being that this limits the freedom of the firm to shift its product among buyers and markets.

Some of those who question the value of the central market quotations as a basis for pricing point out that country sellers do not understand the quotations and cannot predict from them what their own butter should bring.

The criticisms of another group arise from the claim that the central market quotation fails to reflect the price of butter satisfactorily. Some of these are more concerned with the view that the volume of trading in the central market is not large enough to constitute a representative sample of butter trading all over the tributary area.[6] Others place their emphasis on the degree of day to day fluctuation which has characterized the central market quotations, viewing them as unnecessary to bring about the usual seasonal adjustments between production and consumption.

Basis for These Criticisms

Let us examine the factual basis for these criticisms:

We have shown where use of the quotations and the premium system does exist, but to say it is bad is meaningful only in terms of alternatives for doing the same thing. Some of the alternatives we will try to list at a later point.

Although nearly all Wisconsin creamery managers tend to stay

[6] This is one of the criteria for a satisfactory central market price set forth by Geoffrey Shepherd, *Marketing Farm Products*, Iowa State College Press, Ames, 1948.

by their regular buyers, we have found little evidence that these agreements are regarded as binding in a legal sense. The wholesale trade refers to them as a sort of condition for consignment. They do not serve to prevent sellers from seeking other outlets or accepting offers elsewhere. Rather, they appear to be a sort of gentlemen's agreement, usually verbal, seldom confirmed even by a letter, and almost never by a written contract. They can be terminated at any time at the will of either party with no penalties. Usually the buyer will accept the butter whenever the creamery has accumulated a truckload. As a matter of fact, in opposition to the view that the agreements are too binding, one could argue that if the factories must use them they should insist that the agreements be more dependable and should examine them in a more business-like way.

Let us look at the criticisms of the quotation itself: First, the factual basis for the statement that country sellers do not understand the quotations they use in their selling arrangements. This confusion arises from the understatement of the Price Current quotation, the range in the Market News price, the differences between these quotations, the lack of uniformity among the various media of price information, and from the many direct and indirect ways of introducing a premium into the sale. The buyer tends to understand these things but the seller does not. Also the buyer has many sources of information on important supply and demand factors independent of the quotation, which the seller does not have.

We have made spot checks of schedules from our Wisconsin butter pricing survey, to compare butter prices under terms of his agreement as reported to us from memory by the creamery manager with the price he received according to his sales analysis sheets. Seldom were these two figures the same, even for the largest plants in the state, where one would expect the management to be well informed. The figure the manager received tended to be somewhat lower than the quotation he thought he was getting, even though he was getting more than the Chicago Price current quotation less freight to Chicago.

It is equally important that even if the manager understood the quotations commonly used in the state, he would have difficulty in distinguishing between them in the various media through which they come to his attention. Neither newspapers, radio stations, nor

telegraph companies carry reference to which quotations they furnish. Actual copies of the Market News or Price Current arrive one to three days after the day's market they report. Most plants receive the Market News report and only a few receive the Price Current, even though the latter is used more often in pricing agreement sales.

The small differences among quotations can mean substantial ones in returns to plants who do not understand them when entering into agreements. The importance of these differences may be seen more readily when they are expressed in car lots. Based on the average difference for June, 1949, a plant whose selling arrangements specified the lower market news price realized $60 more per car, and $134 per car if based on the higher figure, than if his arrangement were based on the Price Current.[7] For a small plant producing ½ million pounds of butter annually, this means from one to two thousand dollars more income, assuming, of course, that other terms are equal. For the month of June, 1949, a plant whose sales were based on the upper Market News figure would have realized about $74 per car more than if based on the lower, calculating from the average difference.

What is the basis for the claim that the central market quotation fails to reflect the price of butter satisfactorily? How large is the volume of trading on which the Price Current quotation is based? In recent years Exchange spot butter transactions, on which the Price Current chiefly depends, have almost dried up, particularly since the beginning of the government price support on butter in February, 1949. During 1949 about 270 cars of butter were sold on the Exchange. This was 1.7 percent of all butter received in Chicago, and two-tenths of one percent of all butter produced in the Midwest during 1949. This amount of trading, of course, provides a more important indication of price than the same amount elsewhere in the market area would provide. The real fault lies less with the volume than with the way these sales are distributed over time, over the grades, and over the types of transaction. During each

[7] In June, 1949, the midpoints of the range as reported by Market News averaged three tenths of one cent higher than the Price Current for 92 score butter. Only once were the two the same and the difference occasionally was as high as one half cent. For the same month, the upper figure in the range reported by Market News averaged four tenths of one cent higher than Price Current, varying from one quarter to three quarters cents per pound. Even the lower Market News figure for the month was higher than the Price Current 17 out of 22 times, the same four times and less once, for an average of about one fifth cent above Price Current.

of the two months June 1949 and February 1950, there were 15 trading days when the Exchange was open but there were no spot butter transactions of any kind. With one exception there was never a day when transactions on all grades of butter were made.

Those who express the view that the Price Current quotation is not based on an adequate sample of butter traded over the tributary area offer the basic proof that it underquotes the market on an average. Sprague, for example, pointed out that the large volume of creamery sales at or above the quotation showed the tendency for the market quotation to underprice the actual sales by creameries. How could creameries receive more for butter than wholesalers if the wholesale price were actually representative?

Our Wisconsin data also bear this out. During the two months of June 1949 and February 1950, prices received by Wisconsin creameries, adjusted to an f.o.b. Chicago basis, averaged above the Price Current quotation. Possibly the net prices with freight deducted likewise may prove to be above the quotation. Iowa data for September 12, 1949 to January 22, 1950 showed that the average net price received by Iowa creameries for 90 score butter was above the 90 score Chicago quotations, even though shipping costs had been deducted.[8]

When Sprague made his analysis in 1939, the basic elements of the problem of quotations were the same as now. The volume of Exchange trading was small even then, though larger than now. Assuming the Price Current does an accurate job of reporting the exchange price, we may explain the inadequacy of the Price Current by reference to Sprague's reasons why sales on the spot call do not reflect the average price for the grade. They are "(a) The surplus lots sold at the spot call are likely to be the least desirable lots available, for sale at the grade; (b) the butter is not available for examination by prospective purchasers before the spot call and buyers usually want more information than they have available. Such additional information as stencil numbers, flavor characteristics, salt intensity, and body texture are important pricing factors."[9] Sprague pointed out that the volume of sales at the spot call is often too small to constitute a reliable sample for the following reasons: "(a) The cost of selling butter at the 'spot call' makes

[8] "Reporting Butter Prices Receiving by Iowa Creameries," Unpublished manuscript, A. G. Mathis.

[9] Gordon W. Sprague, op. cit., p. 130.

sales off the board more advantageous; (b) when dealers' purchases and direct outlets are in equilibrium, there is no surplus butter to sell."

How large is the volume of trading on which the market news price report is based? This price report is based on a much larger volume of trading in the central market because it includes wholesale transactions from Chicago first receivers to all buyers for delivery within the city. In 1949 current Chicago receipts averaged 9.7 percent of the total Midwest supply of butter and 7.6 percent of the U. S. supply. At no month in that year did it average less than five percent of Midwest supply. Market news prices are reported for an appreciable part of this amount.

How representative of the volume of trading over the tributary area is that on which this report is based? The question is appropriate only because we are examining the value of this price for use as a quotation. Preliminary analysis indicates that prices received by Wisconsin creameries, adjusted to a f.o.b. Chicago basis, tend to fall within the range reported by Market News. We, therefore, cannot say that the range underquotes the market. However, prices quoted in a range do not lend themselves well to use in agreements because of their indefinite nature. If we are seeking a more useful quotation it is not enough to say that Market News is not reported for that purpose. It represents the central market wholesale price better than the Price Current, and so in the search for an improved quotation it is one of the alternatives.

During the period 1946 to 1949, both the Price Current quotation and the market news price were characterized by somewhat the same day to day fluctuations. This condition arose because many of the prices reported to the Market News office are not arrived at independently. Many of the trades between first receivers and their buyers are priced on the so-called "basic quotation" from the Exchange, with premiums or discounts ranging around it. This likewise tends to tie the market news price to the Exchange.

Sprague pointed out two fairly distinct problems here. One is that of developing a quotation which more nearly reflects the average price of the grade. The other is developing a price that is less subject to day to day fluctuations. His analysis of the central market quotation showed that wholesale prices merely reflect adjustments in surpluses and deficits of dealers trading stocks rather than equilibrium between the factors of supply and demand. Con-

sequently the wholesale prices showed more fluctuation than would be necessary if the quotations reflected and equilibrated butter production, total dealer stocks, storage operations, and consumer demand. Those who work on quotations may focus on one of these problems at a time, though obviously the two are interrelated so that a solution for one would tend to remedy the other.

Alternatives

It would seem that the alternatives to the present system of butter pricing at country points, broadly stated, consist of about four. They are:

1. Alternative one would aim to change the quotation better to suit the existing pricing methods with particular reference to country plants.

2. Alternative two would strive for improved knowledge about the present quotations and efficiency in their use while leaving methods of reporting quotations and agreement selling unchanged. This would require adjustments elsewhere. Some of them are: (a) A general program of information to plant managers to acquaint them with differences in quotations and ways of bargaining more effectively on basis of them. (b) A program to get the wholesale trade away from use of quotations for transactions beyond the country plant level, at least in their open market sales. Where they use them they may be urged to use the quotations of the previous day.

3. Alternative three would consist of altering the marketing process that furnishes the basic data while leaving methods of reporting and agreement selling unchanged. For example, persuading the Board of Governors to change the rules of the Exchange, such as to encourage a larger potential supply of butter at any one time and thus to improve the reliability of the Exchange as a barometer of prices. Perhaps useful experience could be drawn from the revisions of the rules under which the Wisconsin Cheese Exchange operated.[10] These revisions were at least partly responsible for increases in the volume of trading on the Wisconsin Exchange from one half million pounds in 1937 to about 12 million in 1947.

4. Alternative four comprises methods by which factory sales, whether individual shipments or contracts for seasonal output,

[10] A. H. Miller, *Pricing American Cheese at Wisconsin Factories*, Wis. Research Bul. 163.

would be based on a dollars and cents price without reference to a daily quotation. This in effect might mean discarding the agreement method of pricing. Operation of a pricing board to arrive at a price, such as that recommended by Sprague, might fall in this category depending on how the board operated.[11] Sprague thought of a pricing board to recommend a weekly price as a means for leveling daily fluctuations not justified by conditions of supply and demand.

The findings of our regional study will provide some data useful in exploring each of these alternatives. Our time here does not permit further comment on this. We may look briefly at the first of the alternatives. What may be necessary to improve the usefulness of quotations for butter pricing at country points, with the present methods of sale?

Because of the differentiation in channels and in services it may be that we no longer can expect the price at one stage of marketing or for one group to furnish a single effective guide for pricing at country points. The following preliminary data from Wisconsin factories illustrate this differentiation and the declining importance to the pricing mechanism of the wholesale central market transaction. For June 1949, Wisconsin factories sold 34 percent of their volume through cooperative sales agencies; 25 percent to local outlets such as patrons, retail stores, and restaurants; 20 percent to wholesaler-jobbers; 12 percent to other dairy companies; six percent to retail grocers outside the local area; and the balance to meat packers and the government. In general, the receivers other than wholesaler-jobbers maintain their own distributive systems direct to retailers practically all over the country. Adding the estimated amounts they sell to wholesaler-jobbers would bring the proportionate volume of that channel up to 25–30 percent.[12] No Wisconsin data compiled on the same basis is available for previous years, but estimates based on sources which report national data suggest that wholesaler-jobbers may have handled up to 45 percent two decades ago.

In addition to the transition towards other types of receivers, the wholesalers and jobbers have integrated their functions, a tendency which appears to have speeded up in recent years. Perhaps our problem calls for a system of price reports reflecting the various

[11] Gordon W. Sprague, op. cit., p. 131.

[12] Estimated on basis of *Large Scale Organization in the Dairy Industry*, Froker, Colebank and Hoffman, U.S.D.A. Circular No. 527, Table 21, p. 38.

channels or various stages. This, however, could be even more difficult to use at country points. More research is needed to evaluate potentialities of reporting at each distinct stage. Here are some that have been suggested: (1) The report of a specific price obtained by first receivers within the central market. A specific price, if it could be reported, would remove the difficulty of using a range as a basis for settlement, but would not get us far away from the basic difficulties that go along with a quotation based on wholesale trading in central markets. (2) Prices received by creameries on a f.o.b. central market basis or by zones. (3) Jobbing prices, i.e., prices paid by retailers, restaurants, and others who buy from jobbers. (4) Retail prices.

Considerable work has been done at Iowa by Mathis and his associates, on prices received by creameries compared with commercial quotations.[13] Data provided by the research on which McCallister reported at this meeting may reach a point where the feasibility of a retail price report may be explored. L. M. Davis and others have explored the possibility of accurately reporting jobbing prices.[14] Complementary studies must precede the recommendation that a price at any one of these levels has characteristics that are desirable for a quotation.

For example, if one were deciding whether a price received by creameries would provide a desirable quotation, the pertinent questions would include:

How close is the grade-price relationship at the creamery level?

Would the amount of services attached to the product be as well understood?

Would sales in a larger number of channels be recorded?

Could prices received by creameries be issued as a central market quotation?

Would the price at the creamery level show more direct influence of production, storage operations and consumer demand throughout

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[13] A sample consisting of 39 Iowa creameries which market their butter individually once each week voluntarily reported their prices received. The report included butter sold on a Chicago basis and that sold on a New York basis by grades for each day of the week, by car lots and less than car lots. Grades were established on the basis of a periodic federal grading at the creameries, carried on specifically for the project. Prices were gross at the point of delivery, which, of course, varied among different creameries and among different sales in the same creamery. This representative group of creameries has also reported net prices for print butter sold locally. See A. G. Mathis, op. cit.

[14] L. M. Davis, op. cit.

the tributary area as well as dealers' stocks in central markets?

Is the product priced at that point so that prices could be reported as accurately as central market wholesale prices?

Could such a price be collected and issued daily as the central market wholesale quotation is issued?

All the alternative levels for price reporting share one difficulty in common. Can the creameries be induced to adopt another report as a basis for pricing butterfat to patrons and selling their butter? Can the wholesale trade be induced to trade on basis of another price report or quotation? Creameries hardly could be expected to press for a quotation which in some cases could mean the virtual disappearance of the premium system to which they are accustomed. The trade in time might adjust its practices, depending in part on whether the commercial price reporters continued to report transactions in the present way.

Perhaps this has illustrated some of the manifold problems of providing a more useful quotation for country plants, as one alternative to present methods of butter pricing at country points. If it were possible to develop a quotation based on a more representative sample of butter transactions in the market area, it would appear that public price reporting agencies may be the best suited for it. These agencies have more funds and trained personnel, as well as a better organization for collecting prices. However, the U.S.D.A. may not now have authority to issue a price for use as a quotation. Some enabling legislation may be required.

We know, of course, that market news price reports are useful in many ways quite apart from serving as a basis for pricing sales. Among other uses, they furnish data for checking commercial reports.

Much of the responsibility for the failure to understand the quotations and for their shortcomings lies with the Land-Grant colleges. If they kept information before country firms in their areas on the amounts which the central market quotations tend to underquote the market, the problem we have outlined would become less important. Also a fund of current information about effects of local changes in the marketing system would aid both public and private agencies in their efforts to revise and improve their reporting systems. This may call for more studies by the Land-Grant Colleges to keep abreast of these changes, analyze the effects, and make known their findings.

DISCUSSION

HERMAN M. SOUTHWORTH
Bureau of Agricultural Economics

Programs like Market News, designed to facilitate and improve marketing, can be appraised by economic criteria alone. But the objectives of the Food and Drug program are chiefly non-economic. Economic appraisal of it can only estimate associated costs and gains or suggest less costly ways of achieving its objectives.

I shall compare its effects with those that would hypothetically occur under perfect competition. As regards adulteration, if we assume that fully informed consumers would reject the same products that are barred from commerce by Food and Drug regulations, the effects are the same as would occur under perfect competition. The assumption is plausible since the regulations are based on expert knowledge.

As regards misbranding, Food and Drug regulations require certain minimum information regarding products and they prohibit misinformation, both of which should contribute to competition. They also impose standards covering identity and quality of products and fill of containers. While such standards restrict the range of competition, they reduce the burden of information necessary to make competition effective.

Thus the Food and Drug program involves, in part, using the police power as a substitute for market information. This raises issues regarding the economics of information itself. In the theory of perfect competition the costliness of information is commonly overlooked.

Substitution of police power for provision of information may be justified economically if it is cheaper and if it is an effective substitute. To provide all consumers the information essential for enlightened choices of foods and drugs would in many cases be not only costly but quite infeasible. The test is then the degree to which Food and Drug regulations are equivalent in effect to the results of informed consumer choices.

Recognizing that there are border-line cases like those that Gaummitz discusses, I would agree with him that little question can be raised on economic grounds regarding the Food and Drug program in general.

DISCUSSION

A. G. MATHIS
Production and Marketing Administration

Mr. K. J. McCallister pointed out that the role of market news is to serve free enterprise by supplying the economy with the information it needs to make prompt adjustments in supply and demand, so as to obtain optimum use of resources in distribution as well as in production.

Plans for the development of retail market news are of particular interest. Consumers and retailers have had relatively little aid from market news. From an economic viewpoint, the lack of reliable information at that

level has been deplorable. Wholesale market news alone can hardly accomplish the task of bringing competition and flexibility into the distribution of farm products.

At present, middlemen between consumers and producers interpret consumption for producers and supply for consumers. Their interpretation is not necessarily in the public interest. It is sometimes influenced, perhaps too much, by opportunities for private profit. Retail market news may strengthen this weak link between consumers and producers. Mr. McCallister has pointed out some of the inflexibilities and wide ranges in margins existing in retail distribution. These probably give market news more opportunity at the retail level to contribute toward efficient use of resources in food production and distribution than at any other level.

There are limitations to the contributions retail market news can make toward perfect price responses: (1) Services that are included in retail prices justify some of the price differences between stores. The service of providing commodities for purchase at a preferred point commands a price. Therefore, high price stores with location advantages can be expected to persist. (2) Consumers probably often shop for a "market basket" of commodities and services, rather than for individual food items. In such cases, the price for the "market basket" rather than for the individual commodities would guide buying. (3) The effectiveness of market news depends on accuracy, timeliness, and the extent to which it is used. In order to stimulate consumer price consciousness so that retail market news can be effective, a great deal of educational effort will be needed. Probably for some time the chief value of the news would be to furnish home economists, extension workers, institutional buyers, and educators information to guide the public's buying.

* * *

Dr. Cook's discussion of butter marketing practices and butter price quotations appears to set forth a case where price quotations are made on an unrepresentative coverage of sales and hence are questionable on the basis of accuracy. Further, his paper gave me the impression that the butter industry, and perhaps research workers in this field, do not understand fully the role of U. S. Market News, which furnishes information for the use of the public. It does not establish a price level. The idea that Market News should establish a single quotation around which bargaining centers is not in line with its role as a purveyor of complete marketing information.

Dr. Cook has suggested several alternatives to the present pricing methods. *One alternative* was to pursue a "hands off" policy toward market information and marketing methods, while improving country plant operators' knowledge of the existing marketing methods and news—in effect, a proposal for an educational program in dairy marketing. RMA funds for extension projects of this sort are available in addition to the usual extension funds. It is a responsibility of individual states to initiate such projects where needed. This type of program would supplement a market news program for any marketing system and would not be an alternative. An educational program on market news, however, does not get at the basic causes which have brought butter quotations into question.

A second alternative suggested by Dr. Cook was to change selling methods from contract selling to open market sales of each lot of butter with pricing in dollars and cents, rather than subject to premiums and discounts from a base quotation. It is improbable under the present organization of the creamery industry, that creameries can or will turn to open market selling for the following reasons: (1) Creameries lack storage facilities and the financial ability necessary for holding butter from market even the few days needed for short-run selection of a marketing day. Farmers, managers, and boards of directors refuse to accept the risks involved in marketing each lot of butter on a dollars and cents basis. Farmers' refusals take the form of limiting their capital investment in creamery facilities and operating capital. Their decision may be justified by the relative marginal returns for capital in marketing butter and in other uses. Managers fear the loss of their positions if they make errors in marketing judgment. (2) Costs to the creameries of making contacts with purchasers for each lot of butter sold, both in uncertainty and risk and in dollars and cents, may exceed gains from the proposed change in selling methods, particularly for creameries selling their butter in relatively small lots. (3) Farmers and managers do not appear to be aware of the fact that under the present conditions the final incidence of uncertainty and risk is on the creameries (and farm-patrons) and the consumers, depending on the relative elasticity of supply and demand curves.

As a third alternative, Dr. Cook suggests altering the marketing processes that furnish the basic quotation by such means as reforming the Exchanges so that their volume of trading will increase. The basic quotation then might become a more satisfactory barometer of butter prices. In 1948 a proposal of this sort was made to the Chicago and New York Exchanges by the creamery industry. The Exchanges did not take effective action on the proposal. The members of the Exchanges presumably operate to maximize their individual net profits. Their actions are not necessarily in the interest of the rest of the Dairy Industry. Short of compulsion, they cannot be expected to forego any present measure of control over butter price levels. For the same reason traders would prefer not to shift from the base quotation they help establish on Exchanges to a U. S. Market News report as a base quotation. In addition, Market News Service's policy of reporting a price range rather than a single price makes U. S. price reports less desirable for basing purposes than the single commercial price quotation.

Increasing the volume of trading on the Exchanges would not necessarily make their butter prices representative of prices for the industry. Direct sales still would not be included. For reasons already mentioned, creameries are not likely to sell on the Exchanges on the basis of a dollars and cents price.

A weekly quotation established through a price board such as the cheese board at Plymouth, Wisconsin, might smooth out fluctuations in base prices, but the daily cash market can fluctuate by means of premiums, discounts, etc., and would not wait for a lagging weekly quotation. The

Market News Service supplements the Plymouth weekly quotation by reporting daily prices for cheese in Wisconsin and in Chicago.

Dr. Cook's fourth alternative was to change price reports to suit pricing methods of country plants. Essentially, this is the solution under trial in the pilot reporting of prices received by Iowa creameries. This reporting is being tried for the following reasons: (1) The creamery level affords a place for reporting representative prices on the major part of butter production. (2) The product—wholesale bulk butter—as sold by creameries is reasonably homogeneous, within grades. (3) The information is directly useful to the atomistic country sellers, without the interpretations necessary if reporting were at other levels. (4) Reporting at the country level is in itself a valuable extension tool which aids country plants to understand their marketing problems. (5) Reporting the range of prices allows the trade and country plants to make free choice of the method of sale most efficient for their resources, while giving them complete bargaining information, regardless of the basic quotation used. The premiums, discounts, and up-and-down grading that now obscure butter pricing can be reported in the range of prices.

As Dr. Cook has pointed out, problems of obtaining a timely report and of obtaining dependable grading are difficult. Also, under creameries' present selling methods, it is doubtful whether such a report will become a basic quotation.

The butter industry has not appreciated the possibilities of market news as a bargaining tool. Rather, it has criticized market news for butter as a basic quotation and ignored the fact that bargaining in the industry is for premiums, discounts, grade and other conditions that qualify the base quotation. These conditions of sale affecting price need to be reported if competitive pricing is to be promoted, since by definition, competition implies reasonably complete knowledge for buyers and sellers.

IMPACT OF MARKETING AGREEMENTS AND ORDERS ON THE MARKETING OF MILK

LELAND SPENCER
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Objectives and Methods of Milk Price Control

PUBLIC control of the pricing of market milk was undertaken primarily for the purpose of raising the incomes of producers to a more satisfactory level. At the time these controls were instituted milk prices and the prices of farm products generally were so low that farmers were hard pressed, and were demanding insistently that effective steps be taken to remedy the situation.

In addition to the primary objective of promptly increasing the financial returns to milk producers, a continuing purpose of public control has been to maintain a stable price structure and to prevent unwarranted reductions in the prices paid producers as result of price wars among distributors, or other causes.

Closely related to this function of stabilizing producer milk prices is that of providing for an equitable sharing of returns from fluid sales and surplus disposal in the various markets, and of eliminating unfair advantages in the purchase of milk that were enjoyed by certain handlers. Before public control was undertaken, some dealers in practically every market bought milk independently rather than through the leading producers' organization. By limiting their purchases to little more than the quantities sold for fluid use, and paying flat prices that were about the same or only slightly higher than the blended or pool prices paid by the cooperative or by the large dealers, these independent buyers obtained milk for fluid sales at a net cost considerably less than the announced Class I prices. Under federal and state milk marketing orders such disparities in costs and returns are eliminated by extending the classified price plan throughout the market, and by requiring all handlers to pay the full Class I price for milk used for fluid sales.

It is obvious that some gain in returns to producers results by making the classified price plan effective throughout the market and enforcing a minimum price for each class of milk. Further increases in producers' returns were sought by the milk control authorities through fixing prices for fluid milk at higher levels than could be

maintained by the milk producers' associations without government assistance. In markets having restricted sources of cream, the prices of milk used for making cream also were raised above the competitive level. Surplus milk was priced competitively with milk used for the manufacture of milk products in other areas. The increased returns from the fluid milk and cream outlets, blended with competitive prices for surplus milk, have given increased returns to producers for their total sales of milk.

Price-raising Effects of Public Control under Different Conditions

The extent to which the prices of fluid milk have been raised through the application of federal and state orders has varied with the location of the markets. The amount of increase also has changed from time to time.

Regional differences

In general, the greatest gains in producer prices under public control have occurred in dairy-deficit areas having the most effective natural or man-made barriers against increased supplies. The dairymen producing milk for such deficit areas as Connecticut, Rhode Island, New Jersey and the District of Columbia probably have derived the greatest benefits from milk control. On the other hand, in marketing areas such as Minneapolis and St. Paul, Chicago, and Des Moines, milk prices could not be raised much above those obtainable by collective bargaining without attracting greatly increased supplies.

The nature of the milk control program and its suitability to the conditions of the particular market also have had an important bearing on the results obtained. In New York, for example, there was no effective control of interstate milk supplies until 1938. Market-wide equalization could not be effected until such control was established. The result was that producers' income gains from state milk control in New York, which had been substantial in the first year or two, declined rapidly from 1934 until combined federal and state control was established in 1938.

The amount of increase in producer returns obtained through extending classified prices throughout the market also has varied from market to market. The greatest gains probably have been realized in New York and other markets that have had relatively large surpluses of milk and where control of a relatively high per-

centage of the milk has been outside the leading milk producers' organization.

Price gains under changing conditions

Farmers undoubtedly received the greatest benefits of milk control during the period of relatively low commodity prices, from 1933 to 1938, or thereabouts. In those years the federal government was endeavoring to raise the prices of milk and other farm products to a parity of purchasing power with the prices of commodities that farmers buy. Federal milk licenses and orders were one of the means used for that purpose. State milk control programs likewise were administered with the main object of raising producer prices.

The milk control programs also brought significant income gains to market milk producers during the early years of wartime inflation, 1939–1942. Prices of fluid milk were kept in closer adjustment with generally rising prices and costs during that period than would likely have been the case without public control. This was accomplished principally through the use of formulas by which the prices of fluid milk were tied to the market prices of manufactured dairy products. In World War I, fluid milk prices lagged seriously, but in World War II, they kept pace very well with the rise in other prices and in production costs.

From 1942 until the middle of 1946, milk prices as well as other prices and service charges were held down by wartime price ceilings, and the benefits that farmers received from the milk marketing orders during World War II were slight. Subsidies were paid from the federal treasury to supplement the limited returns that farmers obtained from the sale of milk.

The fact that all the eastern markets suffered from shortages of locally-produced milk in the fall months of the years 1943 to 1946, and the reports of extensive black market transactions at premiums over order price suggest that higher prices would have been established in a free market than were fixed in the federal and state orders.

The conditions of a sellers' market also were evident following the end of hostilities and the discontinuance of rationing, price ceilings, and subsidies in 1946. The milk supply was hardly sufficient to meet the strong demand. Prices rose sharply, and it was

not uncommon for dealers to pay premiums over the minimum prices required by milk marketing orders. Thus, during the years 1946 to 1948, farmers again derived no significant price advantage from public control.

In the latter part of 1948 and continuing through 1949, however, there was a general weakening of the milk price structure. Stocks of manufactured dairy products increased and the wholesale prices of these products declined. Likewise the prices paid by condenseries and other dairy manufacturing plants were reduced markedly from the high levels of 1947. This was the first experience with a really serious decline in commodity prices since the milk control programs were established during the 1930's.

In the dairy-surplus areas, fluid milk prices were reduced as the prices of manufactured dairy products fell, though not everywhere in the same proportion. In dairy-deficit areas, fluid milk prices were more "sticky," especially where they were supported by federal or state marketing orders. The spread between fluid milk prices and manufacturing milk prices widened to the greatest extent ever recorded.

During the latter part of 1949 and in 1950, there was some tendency for fluid milk prices and manufacturing milk prices to come closer together though the spread still is abnormally wide.

Since the middle of 1948, then, the producers of market milk, especially in regulated markets of dairy-deficit areas, have received considerably more than they would have been paid in the absence of public control.

Major Causes of Changes in Prices Paid for Fluid Milk

When the changes in prices paid for market milk since the beginning of public control, and before that event, are plotted on a chart along with the changes in a number of important elements of our national economy, such as wholesale commodity prices, industrial production, disposable income of individuals, and prices of farm products, a striking similarity in trends is shown. Likewise, the prices paid for fluid milk have followed much the same trend as condensery prices. From these facts it is evident that the major movements of fluid milk prices have been caused by developments far more general in their application than federal or state milk marketing orders.

Fluid Milk and Condensery Prices

How then are we to measure the price-raising effects of milk marketing orders, independent of other influences that appear to have been dominant?

One method that suggests itself is to study the relationship between fluid milk prices and condensery prices, to determine whether significant changes have occurred which might be attributed to the effect of milk marketing orders. Accordingly the prices paid for Class I milk in New York have been compared with midwest condensery prices over a total span of 29 years, 1922–1950. The four years, 1942–1945, were excluded from consideration, however, because of price distortions caused by price ceilings and subsidies. With the war years omitted, there were 13 years of industry pricing and 12 years of public control represented in the tabulation.

For the 13 years in which Class I prices were established by the industry without public control, these prices averaged $1.08 higher than the midwest condensery prices. For 12 years in which minimum Class I prices were fixed by state or federal authorities (excluding the war years 1942–1945 when the effects of such price-fixing were largely nullified by price ceilings and subsidies) these prices exceeded the condensery prices by $1.32 per 100 pounds (Table I).

TABLE I. DIFFERENCES BETWEEN THE NEW YORK CLASS I PRICE AND MIDWEST CONDENSERY PRICES IN PERIODS OF INDUSTRY PRICING AND PERIODS OF PUBLIC CONTROL, 1922–1950[a]

Item	Thirteen years in which Class I prices were established by industry negotiation	Twelve years in which Class I prices were fixed by state or federal orders
	(Amount per 100 pounds)	
New York Class I price	$2.79	$3.50
Midwest condensery price	1.71	2.18
Difference	1.08	1.32
Difference adjusted for change in price level[b]	.96	.99

[a] Excluding the years 1942–1945 when the effects of milk marketing orders were nullified by wartime price ceilings and subsidies.

[b] Actual differences divided by the index of wholesale commodity prices, 1935–39=100.

The increased spread of 24 cents per 100 pounds between condensery prices and fluid milk prices during the years of public control might be attributed to the price-raising effects of state and federal orders for the New York market. However, when adjustment is made for the difference in price level between the periods of industry pricing and periods of public control, the difference in spread between the two sets of prices is reduced to only three cents per 100 pounds.

Actual Prices and Formula Prices of Fluid Milk

For further evidence of the effect of public control upon the level of Class I prices, we may turn to a comparison of the actual prices of Class I milk with the prices that would have resulted from the use of a formula in which the variable factors are the index of wholesale commodity prices, and the percentage of total supply utilized in Class I.

The formula prices have been computed in accordance with the terms of the formula that is now used to determine the price of Class I-A milk under the New York order each month. The average of monthly Class I-A prices that were in effect during 1948 ($5.66 per 100 pounds) is taken as a base. This base amount has been adjusted for changes in the national index of wholesale prices, and for changes in the percentage of the milk supply utilized in Class I.

We cannot tell at what level the base price might have been set, had a formula of this type been put into effect earlier. This does not matter for our present purpose, which is to determine whether the relationship between the formula prices and actual prices was different during periods when state or federal orders were in effect than at other times.

The comparisons between the actual prices and formula prices for Class I milk in New York are summarized in Table II.

During the 13 years when the prices of Class I milk in New York were established by industry negotiation, the actual Class I prices averaged five cents per 100 pounds *less* than the formula prices. During the years in which state or state and federal orders were in effect, the actual Class I prices averaged six cents per 100 pounds *more* than the formula prices. In other words, the actual Class I prices were 11 cents per 100 pounds higher relative to the formula prices during the years of public control than they were during the years of industry pricing. The price gain under public control

TABLE II. DIFFERENCES BETWEEN ACTUAL PRICES AND FORMULA PRICES OF CLASS I-A MILK IN NEW YORK, IN PERIODS OF INDUSTRY PRICING AND PERIODS OF PUBLIC CONTROL, 1922–1950[a]

Item	Thirteen years in which Class I prices were established by industry negotiation	Twelve years in which Class I prices were fixed by state or federal orders
	(*Amount per 100 pounds*)	
Actual price	$2.79	$3.50
Formula price	2.84	3.44
Difference	−.05	.06
Difference adjusted for change in price level[b]	−.04	.04

[a] Excluding the years 1942–1945 when the effects of milk marketing orders were nullified by wartime price ceilings and subsidies.

[b] Actual differences divided by the index of wholesale commodity prices, 1935–39 = 100.

is reduced to eight cents per 100 pounds, however, when adjustment is made for the fact that the general price level was somewhat higher during the years when state or federal orders were in effect.

Both the comparison of New York Class I prices with midwest condensery prices and the comparison between actual and formula prices of Class I milk indicate that Class I prices may have been raised comparatively little through the application of state and federal orders. Such a conclusion would be in conflict with the belief generally held by informed people that during much of the 17-year period of public control, Class I prices have been fixed at higher levels than could have been maintained through collective bargaining within the industry. In the writer's opinion, the statistical evidence is inconclusive, since the price-raising effects of state and federal orders may have been offset by other factors. On the other hand, this evidence does suggest that Class I prices may not have been pushed out of line with other prices and economic conditions as much as has been generally assumed.

Increases in Returns through Public Control of the New York Market

The results of a third approach to this question of how much producers' returns have been raised through public control of milk prices are shown in Table III.

TABLE III. ESTIMATES OF INCREASES IN RETURNS TO PRODUCERS THROUGH PUBLIC CONTROL OF THE NEW YORK MILK MARKET, 1933–1950

Period of time	Type of control in effect	Percentages of total supply[a]		Increase in returns for fluid milk per 100 pounds		Increase in average return to producers per 100 pounds[c]		
		All fluid sales	Fluid milk bought at flat price	Higher Class I price	Class I price for all fluid sales[b]	Higher Class I price	Class I price for all fluid sales	Total
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
July–Dec. 1933	State	57%	23%	$.45	$.20	$.25	$.05	$.30
Jan.–Dec. 1934	State	51	20	.35	.30	.18	.06	.24
Jan. 1935–Mar. 1937	State	52	21	.25	.35	.13	.07	.20
Apr. 1937–Aug. 1938	None	—	—	—	—	—	—	—
Sept. 1938–Jan. 1939	State & federal	63	25	.45	—	.28	—	.28
Feb.–June 1939	None	—	—	—	—	—	—	—
July 1939–May 1942	State & federal	49	20	.35	.15	.17	.03	.20
June 1942–June 1946[d]	State & federal	60	24	—	—	—	—	—
July 1946–June 1948[e]	State & federal	66	26	—	—	—	—	—
July 1948–Dec. 1950[f]	State & federal	57	23	.40	.35	.23	.08	.31
Average[g]		53	22	.29	.22	.15	.05	.20

[a] The total fluid sales and total market supply are assumed to have been the same as actually occurred. This assumption involves a small error not significant for the purposes of this computation. It is also assumed that 40 percent of the fluid sales would have been made by independent dealers buying milk on a flat-price basis.

[b] Difference between the estimated net cost of milk to flat-price buyers, of milk used for fluid sales, and the probable Class I price without public control. The probable Class I prices without public control are the actual Class I prices less the amounts shown in Column E. Estimates of the net cost of milk to flat-price buyers for fluid sales were computed as follows:

(1) The average net price to farmers was adjusted by subtracting the product of the figures in Column E times the percentages in Column C, from the reported net farm price.

(2) The flat price paid by independent buyers was assumed to be 10 cents per 100 pounds higher than the adjusted net farm price.

(3) The net return to flat-price buyers for surplus milk was estimated to be 10 cents per 100 pounds less than the condensery price, prior to July 1946, and 15 cents less from that month on. The estimated surplus return was multiplied by the corresponding percentage in Column D, and the product subtracted from the estimated flat price. The difference for each period was then divided by 100 less the percentage in Column D, to determine the approximate net cost of milk for fluid sales.

[c] The amounts shown in Columns G and H are the products obtained when the figures in Columns E and F are multiplied by the percentages in Columns C and D, respectively. The figures in Column I are the sums of the amounts in Columns G and H.

[d] Effects of federal and state orders largely nullified by wartime price ceilings and subsidies.

[e] During this period, milk supplies were generally short and the conditions of a sellers' market caused competitive prices to equal or exceed the minimum prices fixed by the federal and state orders.

[f] Includes preliminary estimates for the last three months of 1950.

[g] Weighted by the number of months.

In this tabulation are given the writer's estimates of the amounts by which the Class I price has been raised at different times above

the level that would have prevailed without public control. Estimates of the amounts added to producers' returns for fluid milk by making the established Class I prices effective throughout the market also are given. The estimated total gains in the returns for fluid milk have been prorated over the total quantity of milk delivered by producers to arrive at the increases in average prices received by them.

The indicated increases in Class I prices given in Column E are nothing more nor less than the writer's estimates, based upon his general knowledge of the market. The highest estimated rate of increase was 45 cents per 100 pounds, for the periods July–December 1933, and September 1938–January 1939. For the period July 1946–June 1948, no increase is indicated for the reason that the conditions of a sellers' market prevailed and premiums over the minimum class prices were paid by many handlers. The average of the estimated increases in Class I price for the several periods was 29 cents per 100 pounds. The amount of this increase varies with the spread between the Class I price and the blended or pool price paid producers, which in turn is influenced by the Class I price and surplus prices and by the percentage of surplus milk.

The writer has estimated that the flat-price buyers handled (prior to public control) 40 percent of the milk that was sold for fluid use in the New York market. As indicated in Table III, the amounts by which returns for fluid sales by flat-price buyers are estimated to have been raised by public control (exclusive of the indicated increases in Class I prices) range from nothing in the period July 1946–June 1948 to 35 cents per 100 pounds in the periods January 1935–March 1937 and July 1948–December 1950. The average of the estimated increases in returns for the several periods listed was 22 cents per 100 pounds.

When these estimated increases in returns for fluid milk are prorated over the entire volume of producer deliveries, the resulting additions to the average producer price come to 15 cents per 100 pounds for Class I increases, and five cents per 100 pounds for bringing flat-price fluid sales up to the Class I price. Thus the total estimated gain in the average return to producers brought about by state and federal orders from their inception in 1933 through 1950 is 20 cents per 100 pounds of milk.

A further item of gain to producers from public control of milk prices is to be found in the higher prices that have been fixed for

milk from which cream was made for fluid use in New York City. At times these prices probably have been as much as 20 cents per 100 pounds higher as result of public control, than the prices that could have been maintained by industry bargaining. The average gain attributable to public control probably was nearer 10 to 12 cents per 100 pounds of milk from which such cream was made, or approximately 1.5 cents per 100 pounds of total receipts from producers.

Adding the increased return for milk used in making fluid cream to the previously-determined gain on fluid milk brings the total estimated increase in producer returns, attributable to state and federal orders, to 21.5 cents per 100 pounds, for the entire effective period of such orders, exclusive of the war period, June 1942–June 1946.

Effect of Public Control of Milk Prices Upon the Supply and Utilization of Milk

Undoubtedly it is true that the milk supplies of city markets have been increased to some extent as result of the price-raising influence of state and federal regulation of milk prices. Common sense, as well as the findings of a number of investigations concerning the factors influencing milk production, point to this conclusion. It must also be true that the consumption of fluid milk and cream has been lessened in some degree as the result of higher retail prices traceable directly or indirectly to the impact of state and federal orders. The inevitable consequence of greater production and less consumption of fluid milk and cream is larger surpluses.

There has been much speculation as to the amounts of these changes in production, consumption and surpluses caused by public regulation of the prices of market milk. No extensive analysis of this matter is possible within the limits of this paper. However, a summary for the New York market which has been prepared with some attention to findings of research with respect to production and consumption responses to price changes, is given in Table IV.[1]

As indicated in this table, it is estimated that the supply of pooled milk has increased perhaps as much as three percent as the

[1] An explanation of the procedure followed in arriving at the figures given in the last three columns of Table IV is given in Bulletin A.E. 727, Department of Agricultural Economics, New York State College of Agriculture, *Some Effects of Federal and State Regulation of Milk Prices.*

TABLE IV. SUPPLY AND UTILIZATION OF MILK IN THE NEW YORK MILKSHED, 1949, ACTUAL QUANTITIES COMPARED WITH QUANTITIES ESTIMATED TO HAVE RESULTED IN THE ABSENCE OF PUBLIC CONTROL OF MILK PRICES

Item	Actual quantities	Estimated quantities without public control	Difference	
	(*Million pounds*)	(*Million pounds*)	(*Million pounds*)	(*Percent*)
Fluid milk sales—marketing area	3,045	3,107	+62	+ 2
Fluid milk sales—other markets	386	386	—	—
Milk for fluid cream—marketing area	625	658	+33	+ 5
All other uses	2,365	2,083	−282	−14
Total pool volume	6,421	6,234	−187	− 3

result of the higher prices to producers yielded by state and federal orders during 1949 and previous years.

Consumption of fluid milk in this market during 1949 may have been as much as two percent less because of higher retail prices traceable to the public control. Consumption of fluid cream may have been five percent less than it would have been in the absence of public control of prices paid producers for milk used in making cream for this market.

These estimated changes in production and consumption are believed to be near the maximum possibilities, following a long period of public control. When these percentage changes are translated into quantities, the result is an indicated gain of 282 million pounds in the volume of surplus milk produced in the New York milkshed. In other words, the actual quantity of surplus milk in 1949 was 14 percent greater than would have been expected, had there been no public control of milk prices during the preceding span of years.

If this same percentage change in quantity of surplus milk occurred throughout the North Atlantic States, the increase in quantity of milk to be manufactured in this important region would have been about 650 million pounds. This amount is between one and two percent of the milk equivalent of all dairy products manufactured in the great dairy regions of the North Central and South Central States. If all the extra surplus milk produced in the North

Atlantic States in 1949 had been used for making creamery butter, the quantity of butter made from it would have been approximately 30 million pounds, or about one fourth as much as was purchased by the federal government during 1949 for the purpose of supporting the prices of butter and butterfat at designated levels.

Other Effects of Public Control

Public control of milk prices through milk marketing orders and other devices has affected the industry and the public in many ways, besides its direct influence on milk prices. Within the limits of this paper, only brief comments upon these incidental effects of milk control are possible.

As previously explained, public control has brought about more equitable returns for fluid sales and surplus disposal in those markets where market-wide equalization is provided for. In some instances, however, public control has accentuated differences in returns to various groups of producers. For example, a federal order without market-wide equalization in the Philadelphia milkshed, and state control in New Jersey administered for the special benefit of New Jersey producers have prevented a proper sharing of surpluses among all producers in the Middle Atlantic States.

Public control of milk prices has affected the competitive position of certain groups of dealers, by eliminating the advantage they had in buying milk at flat prices, while limiting their purchases to little more than the amount of their fluid sales. Somewhat to the surprise of many, including this writer, most of these dealers have managed to remain in business and to all appearances are doing quite well in spite of the changed circumstances. A possible reason for lack of competitive pressure on these former flat-price buyers is the fact that the larger dealers have been subjected to increased handicaps in dealing with labor.

The fixing of producer prices without control of retail and wholesale prices increases the possibility that certain dealers may attempt to force their weaker competitors out of business. Subsidiaries of large dairy corporations and chain store organizations are types of handlers most likely to take such action. New York has experienced a serious development of this kind during the past year, but happily the pressure was relieved before irreparable damage was done to the competitive structure of the market. The staying power of the smaller dealers in a situation where the spread

between the purchase price and the selling price was less then necessary costs apparently was greater than had been anticipated. It is by no means certain, however, that more serious difficulties may not develop, if and when our markets again experience the strain of rapidly declining commodity prices, serious unemployment, and burdensome surpluses.

The present legislation under which federal milk orders are issued reflects in large measure the thinking of the leaders of milk producers' cooperative associations. Moreover, the federal act and some of the state acts as well have been administered with a view to maintaining the interest and support of cooperatives. Cooperatives are allowed to vote on behalf of their members. Payments to cooperatives from pool funds are authorized in certain of the orders, to compensate the associations for services that help to carry out the purposes of the act. In other orders, deductions are made from returns to independent producers to pay for services supplied by the Market Administrator.

Inevitably, the milk producers' associations have been weakened by having one of their main functions transferred in part to federal and state milk control agencies. On the other hand, market-wide equalization and cooperative payments made possible by public control have helped to overcome one of the major handicaps of many associations—that is, their inability to return to their members prices as high as those paid by independent buyers.

Had there been no public control of milk prices, it is probable that the low prices of 1933 would have continued for a longer time, with the result that more radical leaders might have obtained control of the milk producers' organizations. Possibly these organizations would now be stronger in some respects, but it may be doubted whether they would function more effectively in the interests of producers or the general public.

In general, the federal and state milk control programs have had little effect upon marketing efficiency and costs. An exception to this may be found, however, as to markets in which retail and wholesale prices as well as producer prices have been fixed.

State milk control agencies that fix resale prices have acted at various times to discourage or delay the adoption of such innovations as paper containers and the growth of cash-carry distribution by stores. The use of cost data resulting from existing or past conditions and practices as the basis for future resale prices and spreads

tends to inhibit progress toward more economical methods of distribution.

The opportunity that is afforded all interested groups and individuals to participate actively in the determination of milk prices under federal and state orders should not be overlooked. While there is much variation among the state milk control agencies, many of them, as well as the federal government, hold reasonably frequent public hearings, which all who are interested are privileged to attend and to offer evidence that may have a bearing on the issues under consideration. The price-making procedure is in most instances more democratic under public control than it was when prices were established by bargaining within the industry.

Conclusions

Increased returns from public control have come partly through higher Class I prices and partly by forcing the former flat-price buyers to pay the same minimum class prices as other dealers. In some areas, additional gain has come through maintaining the prices of milk used for making fluid cream at higher levels than would have prevailed without public control. It is estimated that producers in the New York milkshed, during the last 17 years, have received about 21 or 22 cents more per 100 pounds of milk as result of the state and federal milk control programs. This means an increased return of seven percent.

It is believed that production in the New York milkshed may have been increased as much as three percent, while consumption of fluid milk was curtailed not more than two percent and cream not more than five percent. These changes would cause a 14 percent gain in the quantity of surplus milk. Similar increases in surpluses of market milk throughout the North Atlantic States would amount to only one or two percent of the quantity of milk used for manufacture in the great dairy regions of the North Central and South Central States.

THE IMPACT OF MARKETING AGREEMENTS UPON THE MARKETING OF FRUITS AND VEGETABLES

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Introduction

IT HAS been only about 15 years since the advent of marketing agreements and marketing orders under federal legislation. There was some experience with marketing agreements and licenses prior to that time, but in 1935 the statutory provisions relative to the issuance of orders were enacted. Later, in 1937, the entire statute was reenacted, and it has since been known as the Agricultural Marketing Agreement Act of 1937. The statute authorizes the Secretary of Agriculture to enter into marketing agreements for any agricultural commodity. On the other hand, marketing orders can be issued for only a selected group of agricultural commodities. The two most important groups include fresh fruits and vegetables, and milk.

It is important to understand and differentiate between the statutory provisions relating to fruits and vegetables, and those relating to milk. As far as milk orders are concerned, the regulation is primarily that of fixing minimum prices to producers and the operation of various types of pooling arrangements. The same is not true of regulations affecting fruits and vegetables. There is no authority for the fixing of prices of fruits and vegetables to the producer or at any other point in the marketing process; however, those operating under marketing agreements and marketing orders are exempt from the anti-trust laws.

It should be pointed out that we are considering here only those marketing agreements and marketing orders established under federal legislation. Certain states have authorized marketing orders under state legislation; and few, notably California, have developed extensive programs in the field of fruits and vegetables. The federal statute is very limited in its scope. Perhaps the most important limitation is that regulations can be applied only to the handling of *fresh* fruits and vegetables. With minor exceptions, there is no authority to regulate any product which is utilized by canning or freezing. This constitutes a very serious limitation,

especially for certain fruit and vegetable commodities. This is not true of marketing orders developed under some state legislation, and several such programs have been applied to fruits and vegetables for processing. Another limitation affecting fruits and vegetables is the parity limitation. Originally, the statute authorized no action which had for its purpose the maintenance of prices above the parity level. Amendments to the Act now allow regulations governing minimum standards of quality and maturity even though prices may be above parity. While the problems encountered under this limitation have not been particularly serious, they have given rise to administrative difficulties, both to the Department and the industry group involved. In the pricing of milk, the statute provides for exceptions to the parity rule.

At the present time there are 29 federal marketing agreement programs in operation for fruits and vegetables. Several methods of regulation are involved. In attempting to appraise the effect of marketing agreements and orders upon the marketing of fruits and vegetables, it is necessary to keep in mind how such a program is instituted and administered. First of all, no marketing order can be issued unless it is approved by at least two thirds of the producers concerned. Moreover, producers have a principal voice in the administration of any such program. Generally speaking, producers are very hesitant to recommend a regulation which imposes a substantial burden upon them. For the most part, regulations under marketing orders for fruits and vegetables have been nominal in character. It is extremely difficult to measure the benefits or burdens, or the impact, of such a regulation. There is insufficient empirical evidence upon which to base any conclusive findings. In the operation of marketing agreements and orders it is necessary to rely to some extent upon the views of those producers and handlers who have had long training and experience in the marketing of fresh fruits and vegetables. Needless to say, the degree of impact varies with the type of regulation which is involved, and the extent to which it is applied. Perhaps it is well to consider the various types of regulation which have been imposed, and attempt to appraise the resultant effects upon the marketing process.

Quality Regulation

In the operation of marketing agreement programs for fruits and vegetables, the most predominant and popular method of regu-

lation is that imposed on a basis of quality of product marketed. Perhaps this is the result of years of experience and producer education. For many years marketing experts have been advancing the idea of quality improvement, especially for fruits and vegetables. Wherever the subject is discussed, whether it be at a marketing panel, a sales manager meeting, or a distributor group, the hue and cry have been to increase returns by marketing a quality product. Marketing agreements and orders have provided a method whereby this goal could be translated into a cohesive industry undertaking.

For the most part, quality regulation of fruits and vegetables has been applied on the basis of grade, size, or maturity of the product marketed. Such regulations have been devised in an effort to supply the market with the quality of product which would satisfy the consumer and yield the greatest aggregate return to the producer. This type of control has been used for all types of fresh fruits as well as potatoes and a few vegetables. In recent years there has been a keen interest in maturity regulations. Market operators have long complained that certain products, especially fruits, have been marketed before the proper stage of maturity had been reached. Perhaps you have had similar experience in purchasing fresh fruit at a retail store.

The maturity of citrus fruits has long been governed by state legislation under which maturity inspection has been required. For the soft fruits, however, the maturity requirements have been developed by means of marketing agreements. Peaches, Bartlett pears, and plums have been notable in this field. More recently, producers of early potatoes have been experimenting with the use of maturity regulations. There is every indication that the use of maturity standards or regulations will increase and perhaps become more stringent. The greatest shortcoming to the use of maturity regulations is the lack of an adequate measure of maturity for the various products.

What is the impact of quality regulations upon the marketing of fruits and vegetables? Basically, I think it has been at a minimum. For those products which have an alternative outlet the impact has been almost nil. The better grades and the preferred sizes have been shipped to market in fresh form while the remainder has been processed. For those products with no alternative outlet the regulation has resulted in off quality products being kept off

the market. Grade and size regulations have caused changes in the picking, harvesting, and packing process. In many instances, producers have adopted a program of picking for size. This has been difficult and incidentally increased the size of the crop. Packing operations, of course, have had to be geared to the rate of picking. In some instances, additional machinery has been required to eliminate off quality products at the packing house door and avoid the expense of washing and processing. Through the use of grade and size regulations, an attempt has sometimes been made to delay the marketing of an oncoming variety of product until the outgoing variety was marketed. This has caused some inconvenience as well as disagreement among producers and handlers.

Grade and size regulations have resulted in some changes in packaging and have encouraged standardization. In some areas it has been the practice to market products in a container of any kind or description. Many were secondhand crates, not especially suited for the purpose. The requirement of grading and sizing the product has tended to promote the use of uniform containers and a uniform pack. It is sometimes said that regulations tend to favor the large, well established units of production or marketing to the detriment of the small enterprise. In some instances I think there is merit to this argument.

Perhaps maturity regulations have had a greater impact upon the marketing of fruits and vegetables than have the other quality controls. Unquestionably, the regulation of maturity has delayed harvesting and marketing. There is always a natural urge to get to the market with the first carload of the new season's product. Maturity control naturally complicates picking of fruits. It necessitates more attention and care in packing and handling. In the case of early potatoes, it requires leaving the potatoes in the ground for a longer period, perhaps at the risk of insects and disease associated with such a practice. The regulation of maturity has definitely resulted in more careful handling of the product. Boxes are being used instead of bags for potatoes, foam rubber has been used to prevent bruising. Grading, washing, and packing equipment has been improved. The necessity of meeting a certain maturity requirement has focused attention upon care and precaution in harvesting, packing, and shipping. By and large, maturity control has been enthusiastically endorsed not only by the producer, but even more so by sales organizations and terminal market operators.

A significant feature when considering quality control is that of inspection. In order to ensure that all products marketed meet the requirements of the regulation, it is necessary to have compulsory inspection. Such inspection is ordinarily performed by the Federal-State Inspection Service, and a certificate is provided certifying the quality of each individual shipment. The requirement of inspection may be construed to have an impact upon the marketing of the commodity. It results in an additional cost. In many fruit and vegetable industries, inspection has been adopted over the years as a good marketing practice, and in other industries it has not. Under marketing orders where inspection is mandatory, there have been some complaints of delays and added costs, the unavailability of inspection on Sundays or holidays, as well as the constant vigilance required to maintain a particular grade. The adoption of marketing orders has caused a substantial increase in inspection, but the problems involved have been negligible.

Regulation of Quantity

Two types of quantity regulation have been adopted in the marketing of fruits and vegetables. First, there is the regulation of shipments on a weekly or periodic basis. This scheme has been used by the California-Arizona orange industry and the California-Arizona lemon industry for a period of years. Under this method an attempt is made to market the entire quantity of oranges by spreading the shipments throughout the varietal season on the basis of the amount the market can absorb. In the case of lemons the quantity has been regulated from week to week, but in most instances, no attempt has been made to market the total quantity of lemons in the form of fresh fruit.

The second method is that of fixing the total quantity which can be marketed for the entire season. It takes the form of fixing the percentage of the entire crop which can be marketed in the form of the fresh product. This scheme has been used during the past season on both raisins and prunes, and has been used for a number of years for walnuts. More recently, it has been adopted in the marketing of filberts and almonds. At the beginning of the season an analysis is made of the quantity of the product which can be disposed of in all markets and such quantity fixed in terms of a percentage of the total crop. The remainder is diverted to reserve

or surplus pools and disposed of in such manner as not to interfere with the primary market for the product.

Regulations by quantity, in my opinion, have a more pronounced effect upon the marketing of the product than do regulations by quality. In the case of California oranges the regulation has not been particularly severe. In practice, the total crop is marketed although it is spread over the entire season for the variety of fruit concerned. The operation of such a regulation has been inconvenient to certain types of handlers. It has required that their operations be continued for a longer period of time than would otherwise be necessary. For instance, if a given handler has only a small quantity of Valencia oranges under contract he could harvest and market them in the early part of the season and close his plant. Under regulation he is permitted to market only a given quantity each week and therefore must continue operations over the entire shipping season. It has also slowed down picking operations. This may result in less economic operation of his packing facilities, although it must be remembered that not all the crop can be marketed during the early part of the season.

The order for California oranges has also encountered problems in equalizing the differences created by soil, climatic, and other factors. In some parts of the producing area, oranges mature earlier, they will not remain on the trees as long, and have different keeping qualities than fruit produced in other districts. Any regulation which seeks to give each producer his fair share of the market each week of the season is bound to affect various producers differently under these conditions. The California orange order has operated for a long period of years without any significant changes. It has been observed that the industry tends to depend upon the operation of the order, to the detriment of aggressive sales programs. It is sometimes said that the California orange industry has been slow in adopting new ideas and new methods. Perhaps the order is in part responsible.

Regarding lemons, the regulation of the total quantity which may be shipped has definitely restricted the quantity which could be disposed of in fresh fruit outlets. The records will show that in a normal season the industry has withheld from the fresh fruit market about 30 percent of the total lemon production. The industry has considered it to be in its best interests to restrict the volume

of lemons sold in the fresh fruit market and convert the remainder into by-products. A similar method was followed by the industry before the marketing order was in effect. This scheme may have resulted in a greater impact on some operators than is true with others. Lemons are ordinarily picked green and stored for varying lengths of time. This necessitates rather expensive storage facilities. The regulation has operated to encourage the storing of lemons and has necessitated the building of additional storage plants and facilities. It is possible that the order has encouraged the storing of lemons which would otherwise have been disposed of directly in by-product channels. The lemon order has made it extremely difficult for a local market operator to purchase lemons directly from a producer, process the fruit, and market it. It is almost impossible to operate on such a basis because the fruit must be shipped over a period of time. The order is geared to the customary method of handling lemons and to operate otherwise is a problem.

The regulation of prunes and raisins has been in operation for only one season. Last year a very substantial quantity of both fruits was placed in surplus and reserve pools. The order requires that when the producer delivers his fruit to a packer, a given quantity must be held in a specified pool for disposition by the administrative agency. Such a regulation could, of course, have a substantial impact upon the marketing of the product. Inasmuch as quantities are involved, any change or manipulation of the quantity of fruit which is set aside in the various pools and the use made thereof could have a very material effect upon the market. Last year, however, the fruit in the various pools was disposed of advantageously to the producer and all factors in the industry have supported the program.

Walnuts have been regulated on a similar basis for some 15 years or more. A given percentage of the crop is permitted to be sold in the form of in-shell walnuts, while the remainder is set aside for shelling or for export. The order necessitates, or almost requires, the shelling of a substantial portion of the walnuts. It is true that the number of shellers operating in the industry has increased tremendously and it is possible that certain elements in the industry have been prejudiced to the advantage of other groups. Here again, the walnut industry looks upon the operations of the order as a "must," as an integral part of its marketing program. Perhaps they are paying too much attention to it. Inasmuch as

only in-shell walnuts are controlled, there has been a tendency to overemphasize the in-shell market for walnuts at the expense of the shelled outlet. There has been a significant change in the utilization of walnuts and it is doubtful if the operations of the order have been such as to recognize the changes in marketing. On the other hand, there has been a great expansion in the sale of in-shell walnuts under the program. The same method of regulation is used in the order regulating the handling of filberts, which has operated only one year. In both walnuts and filberts, however, there is always an outlet for the quantity which cannot be disposed of in the primary market. As a result, the regulation is not as severe as is true where the total quantity is under allocation.

There is an additional type of volume control which has been used from time to time and which is currently in vogue in the shipment of Tokay grapes. This involves the regulation of the number of carloads of grapes which can be shipped in interstate commerce each day. Inasmuch as practically all such grapes are shipped by rail, it includes essentially the total supply of Tokay grapes shipped to market. Grapes are packed and loaded and moved to railroad concentration points where they are funneled out at the rate of a specified quantity per day. Such a regulation has the tendency of holding the grapes in transit longer than would otherwise be necessary. It requires additional icing and, of course, does not improve the quality of grapes which reach the market. Such a regulation has an effect upon the marketing of grapes, both at the shipping point and in the terminal markets. If too many grapes have been packed and appear at the railroad concentration points, it has been the practice to declare a packing holiday. The purpose, of course, is to stop loading for a time in order to allow all cars to more from concentration points. While there may be advantages in restricting shipments to a given quantity per day, the disadvantages of such a regulation are obvious.

All regulations involving any periodic control of volume are more or less complicated in character. It requires several years of experience before a satisfactory basis of operation can be achieved. There is more enthusiasm for volume regulations among receivers and terminal market operators than at the shipping point or in producing areas. In the terminal markets it has been argued that a steady supply of any particular commodity is of paramount importance. Brokers and terminal receivers argue that they are not con-

cerned particularly with the level of prices, but rather, they are interested in avoiding fluctuation in the price level. Many have been outspoken in favor of regulation in that they are assured of the amount of the commodity which will reach the market each week and are protected from an avalanche of arrivals in the face of an adequately supplied market.

There is an additional type of regulation used for one specific commodity which probably has a farther reaching effect than any other marketing order. This regulation applies to the hop industry and is authorized by a special provision of the statute. Most hops are grown in a rather small and restricted part of the country. Relatively speaking, there are only a few producers. The crop is expensive to produce. It is not particularly perishable. It is a perennial crop and the producers remain rather constant from year to year. The hop industry has been experimenting with methods of control for a number of years. Under the current marketing order there is a control over the quantity of hops which can be marketed by each producer. The amount which can be sold is based upon the amount produced by each individual. Last year was the first year of operation since the war, but the quantity permitted to be sold was substantially less than the total production. This, of course, has a tremendous impact upon the marketing of the commodity. Prices are enhanced and the privilege of selling possesses a substantial value. Hops not permitted to be marketed have little value and the profits involved in violation are great. Such a program involves the greatest degree of regulation which has been attempted under the Act for fruits, vegetables, and related commodities. High prices may lead to increased production and tend to offset any benefits derived. This is one program where the consumers, the brewers, are represented on the administrative agency. Suffice it to say that the hop industry is aware of the limitations of the program, but appears to be intent on following this course of action.

In marketing agreement administration, one of the important features is the information and statistics that are provided. Perhaps such material should be termed a by-product of operations, nevertheless it is of prime importance to producers, handlers, and marketing organizations. Reports from the handlers concerning their operations provide a basis for complete statistics on the crop and its utilization. Time and again we hear the remark that a marketing agreement program would be worth its cost if it did no more

than provide detailed market information and statistics. When regulations cease under a marketing order there is often an attempt to continue the program for this purpose alone.

Perhaps one of the inherent characteristics of regulation is that the rule applies to the average set of circumstances. Regulations do not recognize all of the variations among individual situations and methods of operation. I doubt if an effective regulation can take account of all such variations. As a result, regulations will continue to operate with varying degrees of impact.

DISCUSSION

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Congressional authorizations require that agreements and orders be designed to fit the commodities and areas involved, they must be based on the marketing structures of the industry, and at the same time, effectuate the objectives set forth by federal statutes. The statutes provided few administrative guides and almost any program could be proposed even though there was no specific precedent in law. Congress has said in effect that producers, handlers, and other groups could combine, draw up their own program and carry it out under government supervision and sanction, if the agreements were deemed to further the declared policy of Congress.

On the national level, we can test the impacts against the criteria. Have they: (1) tended to remove barriers which obstruct the free flow of interstate and foreign commerce; (2) provided for the general welfare by cooperative or other action to eliminate unfair trade practices; (3) promoted the fullest use of productive capacities in the industry, and (4) avoided undue restriction of production and stimulated consumption?

A second set of criteria more specifically adapted to agricultural legislation are: Have the programs (1) established and maintained such orderly marketing conditions as will obtain parity prices for producers of the commodity in question; (2) established minimum standards of quality and maturity to effectuate orderly marketing in the public interest; and (3) have they safeguarded consumers from unauthorized price increase to levels higher than parity? Presumably parity is the accepted price standard for marketing agreements, excepting the case of milk. In the case of fluid milk, the secretary may authorize prices higher than parity where the findings show that parity prices are not reasonable in the light of costs and other local consideration, and that a higher price is deemed necessary to assure consumers of adequate supplies of fluid milk. This provision means that important weight can be given to special local situations.

Where programs have been sponsored by producer groups, both the question of "public interest" and trade barriers become confused. While the declared policy of Congress is to foster both the public interest and free

trade, it is hard to keep the issues free of local or regional special interests. Professional opinion on these subjects may be highly colored by local situations, but the fact that interstate transactions are part of all the programs under marketing agreements and orders means that the topic cannot be ignored as a practical matter.

On the question of promotion of fullest possible use of productive capacity, avoidance of undue restriction on supply and encouragement of consumption of milk in high value uses, the interpretation might be either way, but on a national scale the paper reports favorably on marketing orders and agreements.

The best showing for marketing agreements (order) in milk, as I interpret the paper, is to be found in serving the interest of milk producers on an individual market or milkshed basis. In the short-run, practical considerations seem to make for concurrence in autonomous price structures for each given market where it can be shown such prices will effectuate the policy outlined by Congress.

Significantly, where government must approve the pricing schedules and formulas, where producer approval is imperative, and where local feed, labor, and economic conditions provide a basis for establishing a level of prices in each market, the results have been to set a more or less regional pattern of producer prices for regulated markets. There is less consistency in the unregulated markets.

Personally, I am not convinced of any close tolerance between Class I and retail prices. Where competition between dealers is the sole basis for setting the consumer price and where farm or Class I prices are set by formulas (presumed to give parity price or adequate supply) the argument of constant margins to dealers does not follow. Differences between both the Class I price and the margin taken by handlers are comparatively wide if taken market by market. Comparisons based either on geographic location or regulated vs. unregulated markets are hard to make. Local conditions in cities which are widely separated geographically cause a patchwork of prices whether or not marketing agreements or orders are in effect.

The single conclusion I draw from Dr. Spencer's paper is that from the producers' standpoint federal regulation of milk markets has fostered more orderly marketing, and in this sense served its purpose well.

DISCUSSION

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Perhaps marketing agreement programs have small impact because such a small percentage of middlemen are affected. Only first handlers of the fresh product are regulated. Canners and processors, except for asparagus and olives, are not regulated, nor are others engaged in marketing. Regulation of handlers results primarily from the restrictions on the product. Thus, many functional operations of handlers are not affected or are af-

fected only slightly. Method of sale, advertising, place distribution, method of transportation, and credit are not regulated. However, because of product restriction, some handler functions, such as packing, might be slightly affected.

It is interesting to note that in the early days of marketing agreement programs one of the administrators of the Act expressed the belief that marketing agreement and licensing provisions of the Farm Act would contribute to a reduction of marketing spreads by preventing waste in distribution. In general, these views are not shared by administrators today nor is there evidence that margins have been lowered.

Volume control programs are not designed solely to restrict the total volume moving to market, or to even out the flow of the product to market. Whether returns to growers will be maximized will depend on the elasticity of demand under the various conditions. Where regulations make it necessary for individual handlers to make a radical change in the quantity put on the market during a marketing period, or, as Mr. Hedlund has pointed out, extend the marketing season, costs will increase. Without regulation, handlers of course would operate on a week to week basis in such a way that profits would be maximized. This would probably mean that they would move that volume which would enable them to lower their costs.

Certainly, quality regulations have caused changes in packaging and standardization. But I am not certain that the impact of quality regulations is nil when there is an alternative use. In Florida most oranges restricted from the fresh market under the marketing agreement program meet the quality requirements for processing. Furthermore, much fruit that meets the quality standards for the fresh fruit market goes to processors. Under such conditions demand for fresh fruit may be increased by keeping the poor quality fruit off the fresh market. But since there is an alternative market for the low quality fruit, its price need not be lowered—certainly not to the extent that the fresh fruit demand is increased.

Where the demands are interrelated and most of the product meets the quality requirement for at least one alternative outlet, the danger of pricing the commodity out of the market is reduced so long as regulations pertain only to the fresh product. It is doubtful if there is any danger of industry committees pricing themselves out of the market, although theoretically it is possible. A marketing agreement program regulating quality, where there is no alternative use for the low quality, is most difficult to administer equitably. Watermelons are such a crop. When a size regulation is instituted, some growers have a larger percentage of their crop eliminated from the fresh market than others, thus causing inequities. Furthermore, size restriction may result in the loss of those segments of the market preferring the eliminated size.

Mr. Hedlund believes the "regulation of maturity has definitely resulted in more careful handling of product." This we believe is true for some crops such as pears or peaches, but for potatoes we believe that there is less need for careful handling and packing of mature potatoes than immature potatoes.

Through reserve pools and surplus control programs, supplies may be so manipulated as to raise prices and, for commodities with inelastic demand, to increase incomes, at least in the short run. These may do producers permanent harm, however, by raising prices so high as to force substitutes.

It is probable that in the past some consideration has been given in operating school lunch and relief programs to favor industries which were covered by marketing agreements. It is also true, as Mr. Hedlund points out, that regulations which fix minimum prices are applicable only to milk and not to fruits and vegetables under authority of the Act. But, it seems to me that marketing agreement programs are not entirely divorced from support prices at the present time. Since 1948, marketing agreements have become appurtenant to support price benefits. The Agricultural Act of 1949 provides "Compliance by the producer with acreage allotments, production goals, and marketing practices prescribed by the Secretary, may be required as a condition of eligibility for price support" and the House Conference Report on the Agricultural Act of 1949 states (Sect. 401(c)) "will authorize the Secretary of Agriculture to condition price support for potatoes and other non-basic agricultural commodities upon producers agreeing to use marketing agreements and orders . . . ." It appears that the availability of funds which in the past was a condition for price support of non-basic commodities is no longer the chief consideration. Potato growers in California were denied price support because in a grower referendum they did not approve a proposed marketing agreement program. But 3.5 million dollars were spent on peaches because, presumably, there was a program which eliminated 16 percent of the crop. The Department of Agriculture reasonably may be expected to ask of the industry:

"What provision have you yourselves made, what steps have you taken, what steps are you willing to take on your own behalf, to avoid the circumstance in which you find yourself? Is your situation a temporary dislocation beyond your control or is it a chronic condition—in part of your own making?"

Notwithstanding such a stand by administrators, producers are likely to point to the language of the Act and ask for a marketing agreement program. It is my belief that too often the marketing agreement program will be a means to price support. If this is true, then the impact of marketing agreements on marketing may be much more important than indicated by Mr. Hedlund.

TRENDS IN COOPERATIVE EXPANSION*
1900–1950

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IN THE past half century the number of farmers' cooperative marketing and purchasing associations in the United States increased by about 10 times. Elsworth and Wanstall put the figure at 1,223 in 1900. It reached a peak at 14,629 in 1922.[1] By 1947–48 the number had declined to something like 11,000.[2] Not only have numbers increased, but present-day cooperatives are functioning in a different sort of economy, are doing different kinds of jobs, and in general are different sorts of organizations than were those of 1900. In this period of 50 years the population of continental United States doubled. The proportion of the gainfully employed who were engaged in agricultural pursuits dropped from 35.3 percent in 1900 to about 15 percent today.[3] The number of horses dropped from 21 million in 1910 to 5.3 million. The number of automobiles, trucks, and tractors on farms increased from about zero to an estimated 5.3 million passenger cars, 2.4 million trucks, and 3.3 million tractors.[4] The listing could go on, yet all it would mean is that farmers have become more and more closely tied into a complex industrial economy, of which their own activity is a decreasing proportion.

In the new scheme of things, buying and selling have become more difficult for the individual farmer as the roundabout process of farm production has become longer and more complicated. Farm-reared and farm-fed horsepower has been supplanted by

* Giannini Foundation Paper No. 125.

[1] R. H. Elsworth and Grace Wanstall: *Farmers' Marketing and Purchasing Cooperatives, 1863–1939.* Washington, D. C., 1941. P. 33. Processed. (U. S. Farm Credit Admin. Miscell. Report 40).

[2] The latest figure published is 10,135 for 1947–48. Grace Wanstall: *Statistics of Farmers' Marketing and Purchasing Cooperatives, 1947–48.* Washington, D. C., 1950. P. 4. Processed. (U. S. Farm Credit Admin. Miscell. Report 137). The present series is smaller than the series in Miscell. Report No. 40, *op. cit.*, p. 33; it presumably excludes associations for which membership and volume data are lacking. The latest comparable figure should therefore be something like 10,600 to 11,000.

[3] The latest figure based on census data is 17.5 percent as of 1940. Data from H. D. Anderson, and P. E. Davidson: *Occupational Trends in the United States.* Stanford University, Stanford University Press, 1940. P. 16.

[4] Autos and tractors on farms as of July 1, 1949. Data from "Implement and Tractor," *Statistical Data Tractors and Farm Equipment.* P. 5. (Reprinted from 12th Annual Statistical Number, July 9, 1949.)

power from city-made machines, nourished by city-made gasoline and electricity. Natural feeds and farm manures are supplemented by special purpose mixed feeds and fertilizers. Even plant and animal breeding are commercialized.

On the selling side operations have likewise become more complicated. Regional and personal specialization in production has widened the gap between producers and consumers. Direct marketing, still viewed as an ideal in 1900, is insignificant today. Everything seems to pass through several hands; much of it is processed to some extent, and packaged. And in the farm home one sees commercially canned fruits, cartoned or condensed milk, and sliced bread, for some of which the raw material may have come from these very farms.

In the mysteries of these long processes, the farmer has suspected that competition was often deceiving him as to the quality of the services and goods it was providing and was charging him too much. Out of these suspicions, verified by repeated experience, has grown today's body of cooperatives, including a wide range of economic activity.

The cooperative movement in the United States, as we find it in 1900, had an inheritance of several decades of experience. The Granger and Farmers' Alliance activity from 1868 through the 1880's had resulted, as Buck puts it, in "the establishment of an almost incredible number of cooperative or pseudo-cooperative enterprises under the control of farmers' organizations."[5] Practically all of these shortly disappeared. In California alone there were certainly several hundred "discontinuances" prior to 1900.

The first wave of cooperation was already in trouble as early as 1875 when a committee of Grangers reported at the annual convention on its study of the English cooperative system, and gave American farmers its version of Rochdale principles.[6] These had become fundamental in the cooperative thinking as we find it in 1900.

The Roosevelt Era, 1900–1913

We might call the period from 1900–1913 the Roosevelt Era because of the emphasis Theodore Roosevelt gave the rural problem. Throughout the latter part of the previous century and into the

[5] S. J. Buck: *The Granger Movement*, p. 239.
[6] National Grange, *Proceedings*, ninth annual session. 1875. Pp. 94–100

new, there had been widespread criticism of "distribution and marketing."

Throughout this period public men often mentioned cooperation as the farmer's approach to better marketing. The most outstanding advocate was Theodore Roosevelt, who, in his letter appointing members of the Commission on Country Life in 1908, noted that efforts at better production must be accompanied by "the efforts for better business."[7]

The number of active cooperatives increased rapidly in this period from 1,223 in 1900 to 6,375 in 1913. About two thirds of the number in 1900 were dairy cooperatives, mostly creameries. The most striking total gain during the period was in the grain elevator group which increased from 130 to 1,967.[8] In several states, associations of farmers' grain elevator companies were organized and most of these employed secretaries who did much to form new cooperatives along proven lines. It was during this period, too, that livestock shipping associations were getting their start, increasing from 10 at the beginning to 251 in 1913. And in California several large-scale "commodity cooperatives" were already in operation by the end of the period.

Two general farm organizations appeared on the scene in 1902, both of which firs' emphasized price control and later promoted cooperation. These were the Farmers' Educational and Cooperative Union and the American Society of Equity.

World War I Era, 1914–1919

The wartime period from 1914 to 1919 was characterized by a sharp increase in prices which was doubtless conducive to the success of cooperatives. At any rate, the number of farmers' grain cooperatives doubled with an increase of 2,000; the number of purchasing cooperatives more than doubled, and the number of livestock shipping associations quintupled. In the case of fluid milk this price increase directly led to rapid development of bargaining associations. A few such associations had been formed much earlier about the large cities where an emerging class of milk distributors had developed. From 1914 to 1919, with rising prices of feeds and costs of labor, dairymen found it extremely difficult to get prices

[7] Commission on Country Life, *op. cit.*, p. 42. This idea may have been borrowed from Horace Plunkett. See Margaret Digby: *Horace Plunkett.* Pp. 122–132.

[8] Elsworth and Wanstall, *op. cit.*, p. 33.

of milk up to profitable levels. Attempts to use the boycott as a bargaining tool frequently led the officials afoul of antitrust laws. It was the experiences of these bargaining groups, perhaps more than any others,which led to the passage of the Capper-Volstead Act in 1922.

Among the discouraging ventures of the war period was the group of farmers' meat packing companies. Here was a case in which a few shrewd promoters utilized the widely publicized criticism of the big meat packers as a basis for selling stock in farmers' meat packing companies. Between 1914 and 1920 at least 17 such companies were organized, of which 13 were cooperative and four were ordinary corporations with farmers as the principal stockholders. All went out of business as farmers' organizations in relatively short periods. Only one, the Detroit Packing Company, was taken over by a newly organized cooperative in 1933, and is still operating.[9]

A development of long-term significance to cooperatives was the establishment of the U. S. Bureau of Markets and corresponding state bureaus in a considerable number of states. Many of these were later to be of much use to cooperatives, both directly and indirectly. In California this development was unusual as to both immediate and later effects, although it was virtually unnoticed by the rest of the country until 1920. It was late in 1915 that Harris Weinstock was appointed to head the new "Markets Commission." Instead of proceeding to put the state into the operation of public markets as proponents of the legislation had expected, Weinstock proceeded to help farmers organize large-scale commodity marketing associations. The legal work was often done by a young San Francisco attorney, Aaron Sapiro, of whom more was shortly to be heard.

Weinstock's activities directly led to the formation of over a dozen such organizations.[10] Most of them shortly got into trouble, mainly over problems arising out of attempts to fix prices, or of storing products in a season of price declines.

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[9] L. B. Mann: *History of Cooperative Farmer Owned Meat Packing Enterprises in the United States*. Washington, D. C., 1944, pp. 3, 12–13. Processed. (U. S. Farm Credit Admin. Miscell. Report 72.)

Charles W. Holman: "Cooperative Packing Plants." *Marketing and Farm Credits*. (A collection of papers and documents read at the fourth annual sessions of the national conferences on Marketing and Farm Credits, 1916.) Madison, Wis., 1917, pp. 286, 301. The present paper was read at the meeting of the Corn Belt Meat Producers Association in Des Moines, Iowa, January 24, 1917.

[10] For interesting accounts of this movement, see the Annual Reports of the State Market Director of California. Sacramento, 1916 to 1920 inclusive.

Another trend-changing event of this period was the establishment of the Agricultural Extension Service in 1914 and the development of a system of farm advisers to teach farmers "scientific farming," which often came to include cooperative marketing and purchasing. A by-product was the establishment of hundreds of county organizations which soon became known as "farm bureaus." By 1918 a number of these had formed state federations[11] which in turn formed the American Farm Bureau Federation in 1919.[12] The organization started to make cooperative history the very next year, but not the kind its leaders had envisioned.

The 1920's

As the program of the American Farm Bureau Federation began to take shape in the summer of 1920, marketing problems loomed so large that President J. R. Howard issued a call for a conference of all farmers' cooperative associations interested in marketing grain and livestock to meet in Chicago, July 23 and 24.[13] Attention was soon focused on one topic—the grain marketing plan proposed by Aaron Sapiro in a keynote address which started a new trend in cooperative thought. Sapiro characterized as "organized dumping" the methods used by the several thousand farmers' elevators then in operation. He outlined a plan for organization on a "commodity basis" along lines similar to some in California, in which whole regions would pool substantial proportions of their wheat through associations to which growers were bound by "ironclad" contracts. With such organizations, he reasoned, the growers could name their own prices instead of accepting meekly what "the Chicago Board of Trade" might offer. To illustrate, he painted an enticing picture of the procedure followed by the prune growers in California.[14]

Out of this meeting came the famous Committee of Seventeen,[15]

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[11] O. M. Kile: *The Farm Bureau Through Three Decades.* The Waverly Press, Baltimore, 1948, pp. 24–46.

[12] *Ibid.*, pp. 47–57.

[13] American Farm Bureau Federation: *Outlined Explanation of the Proposed Grain Marketing Plan of the Farmers Grain Marketing Committee of Seventeen.* Inside cover page.

[14] Aaron Sapiro: "Cooperative Grain Marketing." Address before cooperative grain marketing conference of all farm organizations, Chicago, July 23, and 24, 1920. Ill. Agric. Assoc., Chicago, 1920. P. 20. The prune example is cited in E. G. Nourse: *The Legal Status of Agricultural Cooperation.* Washington, D. C. The Brookings Institution, 1927. Footnote 7, p. 165.

[15] O. M. Kile: *The Farm Bureau Through Three Decades, op. cit.*, p. 85.

which shortly made proposals that were to keep cooperative grain marketing circles in a ferment through more than half that decade. The national organization it recommended never got under way.[16] A number of statewide pooling associations which did emerge during the early and middle 1920's soon failed, largely as a result of inability to work out suitable arrangements for integration of the new system with the existing local elevator system and, perhaps even more, because of disillusionment concerning the orderly marketing program.[17] Mr. Sapiro had emphasized the price-raising possibilities and minimized the cost aspects of his plan. Thus in 1924 he told Indiana grain growers:[18]

"We don't say that the purpose of co-operative marketing is to introduce any economy in the physical handling of grain, because we think that particular point is absolutely too trifling to bother about. What are we trying to do? When we talk co-operative marketing, we say this: We are interested in raising the basic level of the price of wheat."

In October 1920, President Howard called a conference to consider livestock marketing. Out of this grew the Committee of Fifteen which shortly proposed a plan for livestock marketing as elaborate as that proposed for grain.[19] The plan was to include a network of sales agencies in the various terminal markets to be affiliated with a national association. There would also be separate but affiliated stocker and feeder associations, and all would be integrated with the existing system of local livestock shipping associations.

The "orderly marketing" program which the report emphasized was never developed but a large number of terminal associations were organized. It has not been possible to this date to harmonize this group with the Farmers' Union group of terminal associations, some of which had been organized as early as 1917.[20]

The discussions of livestock marketing during this period seem decidedly confused. In the Midwest discussion concerned the trend toward concentration yards as a means of by-passing central mar-

[16] American Farm Bureau Federation: *Weekly Letter*. February 19, 1925.

[17] For a discussion of this disillusionment see *American Cooperation, 1927*. Washington, D. C., 1928. Pp. 417, 426–433.

[18] Aaron Sapiro: *Cooperative Wheat Marketing*. Chicago, National Wheat Growers Advisory Committee, 1924. P. 8.

[19] Livestock marketing plan of the Farmers Livestock Marketing Committee of Fifteen.

[20] Ward W. Fetrow, and R. H. Elsworth: *Agricultural Cooperation in the United States*. Washington, Gov't Print. Off., 1947. Pp. 90–91. Processed.

E. G. Nourse, and J. G. Knapp: *The Cooperative Marketing of Livestock*. Washington, D. C., The Brookings Institution, 1931. Pp. 109–115.

kets and their sales agencies. In the East and West direct marketing of two different sorts was developing. In the meantime, the cooperative livestock associations movement had reached its peak in 1924 and was soon in a sharp decline, largely because of the motor truck.

During the early 1920's, while Sapiro was working with Farm Bureau groups in the Midwest, he was also working with southern cotton and tobacco groups. In both cases elaborate operations along lines recommended by Sapiro were undertaken during the early part of the 1920's. These fully matched schemes the grain and livestock groups had hoped to develop.[21] Both groups were soon to be disappointed, for most of the schemes failed or had to be reorganized.

While the Midwest and South were experimenting with large-scale cooperatives, patterned after some in California, fruit growers in the latter area were struggling with the problem of noncooperators who refused to join or withdrew from the cooperatives. There was occasional mention of the "compulsory cooperation" schemes of Australia and New Zealand, but more appealing were the clearing house schemes which were widely discussed and sometimes tried.[22] The California Fruit Growers Exchange, the most successful cooperative of the era, found it necessary to establish a surplus disposal plan for lemons in 1925; and in 1928 the peach industry put into operation the first surplus control plan under which a percentage of the crop was "dropped."

In dairy circles the outstanding trend of the 1920's was the growth of the collective bargaining associations after the passage of the Capper-Volstead Act in 1922 had put them in a safer position. These associations developed a number of techniques which increased their bargaining power. Among these were: (1) basic periods for the determination of surpluses; (2) class prices to dealers; (3) payment to producers on the basis of use; (4) taking advantage of city inspection restrictions; (5) development of check-off plans for the collection of dues; and (6) establishment of surplus plants.

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[21] For a good statement on the cotton group, see R. H. Montgomery: *The Cooperative Pattern in Cotton.* New York, The Macmillan Co., 1929.

For a brief discussion of the tobacco cooperatives, see Ward W. Fetrow and R. H. Elsworth, *op. cit.*, pp. 118–123.

[22] Erich Kraemer and H. E. Erdman: *History of Cooperation in the Marketing of California Fresh Deciduous Fruits.* Berkeley, 1933. Pp. 95–117. (Calif. Agr. Exp. Sta. Bul. 557.)

The Depression Era

What we may call "the depression era" really started while prosperity was apparently still in full sway. President Hoover's special session of Congress had passed legislation by June 15, 1929 for the establishment of a Farm Board, and within a month the members had been appointed and were in action. The Board was soon deluged with requests for help. Although the Board had been established for broader purposes,[23] cooperation on a grand scale seemed to offer the quickest remedies, and in a short time the Board was fostering the formation of national cooperatives in a variety of fields. In many ways they reminded one of the proposals made by Aaron Sapiro in the middle 1920's.[24] Although its staff did much to help small associations, the big schemes got the limelight. Some of the organizations the Board had fostered were shortly out of business or had to be reorganized.

The stabilization schemes set up to buy up surplus as a means of supporting prices now sound rather modern. So does another unique scheme which then seemed daring. This was the grape control board set up in California to unite over 85 percent of the handlers of raisins, fresh grapes, and juice grapes. The scheme provided for deductions from proceeds of $1.50 per ton for fresh grapes and an equivalent amount on raisins in order to provide a fund to be used for the purchase of some 300,000 tons of surplus, which was to be left on the vines or utilized in by-products.[25] The scheme collapsed before the season was over.

Farm Board activities from 1929 to 1932 had set the stage for the greatly increased participation of government in agricultural affairs during the next decade. Perhaps it was but the development some had foreseen. It was in 1921 that the late G. Harold Powell, then manager of the California Fruit Growers Exchange, bemoaned the " . . . rush to government to do those things for the farmer which he himself must ultimately do for himself."[26]

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[23] *U. S. Laws, Statutes*, etc. Washington, D. C. 1929. (Public—No. 10. 71st Congress. H.R. 1.)

[24] E. G. Nourse at one time referred to them as "Sapiroesque." He noted a number of board members had "commodity" experience. See *American Cooperation*, 1932, p. 81.

[25] Erich Kraemer and H. E. Erdman, *op. cit.*, pp. 100–104.

[26] G. Harold Powell: "Cooperation in the Distribution and Marketing of Farm Products." Address before the scientific staff of the United States Department of Agriculture, October 6, 1921. Washington, D. C. Processed. (Based on stenographic notes.) P. 4.

The New Deal and Later

With the passing of the Hoover Administration in the spring of 1933 and the dramatic entrance of the New Deal, there was a period of uncertainty in cooperative circles. The large-scale sales agencies set up by the Farm Board were obviously not able to cope with a serious depression. Many associations, both small and large, were in trouble. The total number of marketing associations had decreased between 1929 and 1933 by over 1,500, about half of the decrease being among livestock shipping associations.[27] Then came a sharp turn in public opinion toward more drastic control schemes which would go directly to the assumed trouble—surplus and price cutting. The answer for agriculture generally was allotment of acreage under the Agricultural Adjustment Act. For cooperatives there were the marketing agreements provisos of the same Act.[28] And for many groups, including cooperatives, there was the N.R.A. soon to be ruled out of the game.

Two cooperative groups immediately took advantage of the marketing agreements provisos. These were the dairy cooperatives in city milksheds and some of the cooperative fruit marketing associations.

It is in the field of fluid milk marketing that "marketing orders" have become particularly important. The collective bargaining associations that had developed in the two decades prior to 1930 were particularly hard pressed in the worst of the depression years of 1930 and 1932. Surpluses were everywhere. Price cutting was the rule, and in spite of the bargaining techniques developed during the 1920's, the cooperatives could do nothing about it. Within a few months after the Agricultural Adjustment Act of 1933 was passed, licenses had been issued covering about 70 markets.[29]

It was somewhat of a surprise to see how quickly some of the cooperative fruit and nut marketing associations took advantage of the new legislation. Two of the most interesting are the California Walnut Growers Association and the California Fruit

[27] R. H. Elsworth and Grace Wanstall: U. S. Farm Credit Admin. Miscell. Report 40, *op. cit.*, p. 33.

[28] The Agricultural Prorate Act in California approached the problem by giving each grower a market quota. See H. E. Erdman: "The California Agricultural Prorate Act," this *Journal*, Vol. XVI, No. 4, 1934. Pp. 624–636.

[29] H. L. Forest, "Milk Marketing Agreements and Orders." Annual Convention of Southern California Workers, February 11, 1950. P. 7. Mimeographed address. These licenses were replaced by "orders" after the passage of the Agricultural Marketing Act of 1935.

Growers Exchange, both of which then had and still have dominant positions in their respective fields. The manager of the California Walnut Growers Association had repeatedly warned various groups against carrying surpluses into a new year. In his own case, with something like 85 percent of the crop handled by his organization, he had followed the policy of so pricing the product each year as to clear the market. As soon as legislation provided the means by which the other 15 percent could be brought into a workable program—the marketing agreements provisos—he took steps to bring the walnut industry under a program where it has continued to the present time to divert from a fifth to a third of the crop to secondary uses.[30]

In the case of lemons, the California Fruit Growers Exchange, with some 90 percent of the crop, had continued to operate its own surplus plan in spite of the fact that members at times were required to send over one third of the crop to surplus plants on a salvage basis while outsiders sold all at the supported prices. Both lemons and oranges are now under industry-wide marketing agreements with the Exchange as one of the participants.

I am perplexed as to where the trend toward utilization of control devices is leading cooperatives. Clearly, government takes a more and more important part as control expands with government participation and/or approval. In the case of fruit marketing associations, the surplus control function is being separated from the marketing functions. This may be good, but the situation is not so clear where government purchase enters, or where, under some state acts, industry advertising is undertaken with state participation.

Whatever the effect of controls on cooperatives, the character of their activities will change. Concerning the milk marketing cooperatives, one recent observation is:[31]

> "The functions a cooperative performs are, of course, affected, . . . but . . . cooperatives initiate the controls, [and] largely determine their form . . . . The decision regarding the level of prices is based upon the factual evidence presented by all interested parties at the hearing, and the producers' side of the case rests largely with the cooperatives."

It should not have been a surprise to dairy cooperatives when Secretary of Agriculture Charles F. Brannan announced some two

[30] E. G. Nourse: *Marketing Agreements Under the AAA*. Washington, D. C., Brookings Institution, 1935, pp. 189–195.

[31] Edmond S. Harris and T. R. Hedges: *Formula Pricing of Milk for Fluid Use*. Washington, D. C., 1948. P. 4. (U. S. Farm Credit Admin. Miscell. Report 127.)

months ago a plan to "federalize" the 37 major milk markets in which marketing orders are in effect.[32]

During the past two decades there has been an increasing tendency toward expansion by cooperatives into such ventures as the canning, freezing, or otherwise processing of fruits, vegetables, and poultry products; the processing of milk in multiple product plants; the slaughtering of livestock; the manufacture of fertilizers and sprays; and the manufacture of farm machinery. These ventures lead into fields where they meet the competition of firms with large and extensively integrated units, and where the advantages of size and integration are significant.

I have the disturbed feeling that some of this expansion is not as soundly based as I should like. Two or three years ago I heard a nationally known speaker tell about the purchase by a midwest regional cooperative wholesaler of a small canning plant. The purchase was at a bankruptcy price which was largely met out of the first season's operations. The speaker used the case to drive home his idea that "the really big savings" are to be made in the production and processing fields. I am elaborating on this trend here because I consider such reasoning fallacious, and the trend one to be followed with considerable caution. Our sudden switch into an inflationary economy may save some of these ventures, for the time, at least.[33]

One of the favorable trends in the cooperative movement since 1934 has been the tendency toward sounder business methods. Part of this is the result of an accumulating background of experienced personnel, but a very considerable amount of credit is due the Banks for Cooperatives. Applications for loans from these banks must pass friendly but very critical analysts or appraisers who have brought to light many an error in plans or operations. Many a loan has been requested just to get this evaluation.

As the end of the half century neared, the number of cooperative marketing associations had been decreasing up to 1947–48. The decrease was clearly one of consolidation into stronger units, for membership was increasing. Cooperative purchasing has continued to increase. From something like 10 percent of all business done by farmers' cooperatives in 1913, it increased to 20 percent in

[32] "Dairy Truce." *Cooperative Digest*, July 15, 1950, p. 18.

[33] Since writing the above paragraphs I happened to read a number of articles in *American Cooperation*, 1949, which touch on this problem. See particularly pp. 153–202.

1945–46.[34] The average membership in this group increased from 203 in 1925–26 to 671 in 1945–46.[35]

As the half century ends, cooperatives in general are strong as operating units. New ventures are generally soundly conceived, and the increased understanding and acceptance of revolving finance should help keep cooperatives in the hands of operating farmers.

As I have noted elsewhere,[36] the benefits of cooperation tend to disappear in a few years, yet many cooperatives today are near or past the 50-year mark. Small wonder that one sometimes hears farmers say, "I can do just as well outside the co-op." The explanations may be "disappearing" benefits; i.e., that cooperation has brought on keener competition which is able to meet cooperative returns; that improved returns from speciality crops have lowered prices through increased yields and acres; and that increased returns have passed into land values.

Cooperators facing these problems should be reminded of a remark the White Queen made to Alice in the bedtime story. You may remember how Alice was astonished to see that they had not moved from the spot after running to exhaustion. The Queen explained that in her country "it takes all the running you can do to keep in the same place. If you want to get somewhere else, you must run at least twice as fast as that.[37]

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[34] U. S. Farm Credit Admin. Miscell. Report 119, *op. cit.*, p. 45.

[35] *Ibid.* Computed from page 45.

[36] H. E. Erdman: *Possibilities and Limitations of Cooperative Marketing.* P. 18. (Calif. Agr. Exp. Sta. Circ. 298 (revised 1942).)

[37] Lewis Carroll: *Through the Looking Glass and What Alice Found There.* Chapter II.

COOPERATIVE EXPANSION THROUGH HORIZONTAL INTEGRATION

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THE title originally given me for this talk was "Cooperative Expansion—Horizontal Combination and Diversification."[1] However, I believe that the term *horizontal integration* is more appropriate for our purpose than the term *horizontal combination*, and that under it can also be discussed *diversification*, which implies the use of the same organizational structure for handling additional goods or performing additional services. The term "horizontal combination," which came into use with the flowering of the *combination movement* around the turn of the century, was aptly descriptive at that time. Since the decline of the combination movement, however, the term *horizontal integration* more properly describes the organization under one general control of a number of business establishments of the same type, whether or not formed as a result of "combination." As shown later, few cooperatives which are integrated horizontally represent "combinations" in the common meaning of this term. In general, the term "integration" is now used in the broadest sense to designate almost any kind of union or coordination of business units; and the words "horizontal" and "vertical" are used to convey the distinguishing characteristics of the type of fusion.

According to Nourse and Drury:

> "Two types of industrial integration are commonly recognized—vertical and horizontal . . . . In the process of vertical integration, large industrial organizations are built up by the combination of successive stages in the process from raw material to finished product . . . . Turning now to horizontal integration, we note the growth of large concerns by the process of adding more and more units engaged on a single stage of the industrial process. . . . In a general way, it may be said that such horizontal integration for the purpose of securing monopoly control within a particular line of business was strongly emphasized in the earlier promotional period of big business development, that vertical integration for the purpose of skillful coordination on a series of processes is more characteristic of today's

[1] The approach used in this paper is primarily "institutional" in that it endeavors to interpret the role of integration as it relates to the effort of cooperatives to adapt themselves to differing environments and changing conditions.

large-scale business organization. However, both types of integration must be skillfully interwoven to get maximum efficiency and economy."[2]

I am using the terms "horizontal and vertical integration" to designate these two types of organizational or structural growth, for integration is a process of knitting together, not a form of organization. As here used, horizontal integration implies the general grouping of like business units under one general administrative control, while vertical integration implies the general dovetailing or "fusion" of stages in the industrial process—retailing, wholesaling, manufacturing, etc.—within one business organization.[3]

The two types of integration are so closely related that it is difficult to find pure illustrations of either type. About all that we can say is that some organizations are integrated more horizontally than vertically, or vice versa.[4] The extent of horizontal or vertical integration is thus usually one of degree. The two forms of integration are complementary rather than exclusive.

The mass merchandising chain store systems which combine hundreds of retail units illustrate the concept of horizontal integration, although most chain store systems could more aptly be described as horizontal-vertical integrations. As Malcom P. McNair writes in the May 1950, *Harvard Business Review*, "a chain is in the first instance a horizontal integration of fairly homogeneous enterprises on which broad base is superimposed an apex of vertical integration. . . . " (p. 23 and p. 136) On the other hand, the well-known "integrated" major oil companies which combine within one organization crude oil production, pipeline and other types of transportation, refining, wholesale and retail distribution, are excellent examples of vertical integration, or we might say of vertical-horizontal integrations since they also comprise horizontal integrations.

There is a close relationship between horizontal and vertical integration—even the simplest form of horizontal integration usually results in some degree of vertical integration. For example, a horizontal integration of livestock shipping associations or creameries by federation may lift the selling function from the local to the

[2] E. G. Nourse and Horace B. Drury, *Industrial Price Policies and Economic Progress*. Pp. 76–79.

[3] Cf. Alfred Marshall, *Industry and Trade* (1919), pp. 215–216.

[4] As John Ise has said, "It should not be assumed that horizontal and vertical combinations [integrations] are usually clearly distinguishable, that combination takes either one form or the other, for the two kinds are often found together in an almost infinite variety of forms." *Economics* (1946), p. 118.

wholesale market. There would be little opportunity for cooperatives to integrate vertically without a prior development of horizontal integration.[5]

Integration—Key to Large-Scale Business Organization

The process of integration—both horizontally and vertically—was well established before economists saw its full implications as a principle of business growth. Although Adam Smith was aware that businessmen had a propensity toward combination, he lived when there was no large-scale industry of the modern complex type. Moreover, the industrial system had not changed greatly when Mill wrote his *Principles of Political Economy* some hundred years ago. Mill noted the growth of large-scale enterprises to serve widening markets, but he could not then perceive how the industrial order was to be revolutionized by the perfection of railroads and steamboats, and by many unborn inventions, particularly the telegraph and telephone, electric lighting, the typewriter and adding machine, the automobile and the aeroplane.

All of these new developments widened the scope of business enterprise. Of primary importance was the emergence of the corporate form of enterprise which enabled a business to raise huge sums of capital and operate with great flexibility. Without the peculiar legal advantages of the corporation, *integration* in the modern sense would have been impossible. These new forces began to exert their influence in the United States during and immediately following the Civil War, and men like John D. Rockefeller and John Pierpont Morgan were quick to perceive how entire industries could be brought under one control by pooling and trust agreements, holding companies, or by outright mergers. While the object of these early integrations (combinations) was to gain control of a market and reduce competition to a minimum, it was also found that they frequently resulted in administrative efficiency.[6]

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[5] In the political sphere the growth of the United States illustrates the two forms of expansion. The union of the 13 original colonies was an instance of horizontal integration, although, in forming "the more perfect union," new functions were added beyond the power of the separate combined States. From then on, the Union continued to expand laterally from the center outward as new states were added, and to diversify its functions, with the central government performing more functions directly for its citizens.

[6] Nevins and Commager point out that these combinations "undoubtedly eliminated a great deal of cut-throat competing, achieved greater efficiency, released money for necessary improvements and for research, and made possible mass production and lower prices—but all at a heavy cost to society." *Pocket History of the United States*, p. 301.

The rise of large-scale business was observed by many economists with fatalism. While many feared its growth, others like John R. Commons, Arthur T. Hadley, and John Bates Clark saw it as a natural end to be accepted, if not welcomed.[7] Edward Bellamy, in his *Looking Backward*, written in 1888, conceived of the process of integration or "interlocking" continuing both horizontally and vertically until all business was absorbed in one national trust controlled by the State. Socialist writers of the period also held that the power of large-scale business to proliferate through integrating devices made necessary state ownership and control.

At the present time our economic system is largely characterized by strongly integrated organizations. In this type of economic order the non-integrated concern frequently can exist only at the pleasure of its stronger competitors. This suggests that cooperatives must find ways to achieve the benefits of integration within a cooperative framework or serve as satellites to non-cooperative integrated organizations.[8]

One of the first agricultural economists to call attention to the necessity of integration in cooperative organization structure was John D. Black. In his pioneering study, "Cooperative Central Marketing Organization," Minnesota Bulletin 211 (1924) Black gave a considerable amount of attention to the concept of integration, both horizontal and vertical, as it related to the efficiency of large-scale marketing organizations. He listed 16 "problems which local cooperatives acting alone have thus far been unable to solve satisfactorily." We can almost consider these as 16 reasons for horizontal integration,[9] namely:

[7] See Joseph Dorfman, *The Economic Mind in American Civilization*, Vol. III, for views of representative economists on this issue.

[8] This was brought out in the recent decision of the Supreme Court of Kansas which stated that: "The regional cooperative society is a natural outgrowth of the cooperative movement generally. . . . It is the clear intention of the legislature that locally 10 or more farmers could organize to help each other and that on a larger scale these groups could unite for the same purpose. So long as it is farmers helping themselves and each other it matters not whether they accomplish this by an association of individuals or an association of societies." State, ex rel. v. Consumers Cooperative Association, 183 P. 2ed 423.

[9] In this paper space does not permit an analysis of the economic advantages which cooperatives may obtain through horizontal integration. Generally speaking, horizontal integration permits cooperatives to enjoy the economies and opportunities which are associated with large-scale enterprise: (1) in accessibility and use of capital; (2) in selection and use of management; (3) in application of research techniques, etc. For expanded discussion see my paper, "Advantages of Regional Cooperative Purchasing Systems" (Farm Credit Administration, 1940). For a general analysis of the advantages of large-scale enterprise see John Maurice Clark, *The Economics of Overhead Costs* (1923), especially Chapter VI. "How and Why Large Plants Bring Economy," and Chapter VII, "Economies of Combination."

(1) Control of quality; (2) standardization of production; (3) adjusting production to consumption; (4) stabilizing production; (5) controlling consumption to fit production; (6) controlling the flow to market; (7) distribution of product; (8) inspection; (9) classing; (10) selling; (11) financing; (12) buying and purchasing policy; (13) elimination of competitive wastes; (14) improving business practices; (15) utilization of by-products; and (16) research.

Black returned to the idea of integration in his article in this *Journal* three years ago entitled, "Guideposts in the Developing of a Marketing Program," in which he expressed the belief that the greatest opportunities for increasing efficiency in agricultural marketing lay along the route of vertical integration—either by cooperative or non-cooperative organizations, or combinations of the two. However, Black is well aware of the interplay of horizontal and vertical integration. He writes me on January 23, 1950:

"One of the most significant relationships is that horizontal integration is usually necessary as a basis for vertical integration. Some of the more important gains of horizontal combination cannot be realized except by a certain amount of vertical integration."

With the growth of many large integrated cooperatives during recent years, economists have become generally more interested in the problem and character of cooperative organization structure; and, as a result, specific studies are beginning to appear in this field.[10]

Cooperative Experience in Integration

When two people join together to perform a service for themselves which neither as an individual could perform so well, we have both horizontal and vertical integration of a rudimentary character. When a larger group of individuals form a simple cooperative association for marketing, purchasing, or for performing some other service for themselves, we have horizontal and vertical integration carried to a higher degree. When groups of local cooperatives join together in a federation to extend their sphere of operations, we have horizontal and vertical integration carried to a still higher power.

The concept of federation implies a knitting together or fusion

[10] See Werner Z. Hirsch, *The Economics of Integration in Agricultural Marketing*, University of California doctoral dissertation, 1949. This is the first comprehensive analytical study related to this field. See also papers and discussion on "How Far Should Farmers' Cooperatives Follow Their Products Through to Market?" and on "How Far Should Purchasing Cooperatives Go Toward Primary Sources of Supply?" in *American Cooperation* (1949), pp. 153–202.

of units which is essentially a form of integration. As Nourse has said:

"... cooperative federations are associations of associations. They permit of integration of an agricultural industry horizontally by grouping together many local units of like character. They also permit integration vertically by the addition of functions, ordinarily those of central market or export selling, demand promotion, and packing or processing."[11]

The basic idea of integration, both horizontal or vertical, has long been recognized in cooperative literature and practice. For example, the ambition of the Rochdale pioneers in 1844 to extend the principles of cooperation in an all-embracing way implied the union of individuals both horizontally and vertically through such integrating devices as might be found necessary. Furthermore, it was the achievements of the English Cooperative Wholesale Society which led cooperative theorists over sixty years ago to conceive of the expansion of consumers' cooperatives both horizontally and vertically until consumers had control of all industry. Although this dream of a Cooperative Commonwealth has lost much of its glamour, it still exerts a powerful appeal to those who would like to see economic life better organized for the satisfaction of consumer needs.

The history of agricultural cooperation in the United States prior to 1900 is replete with abortive attempts to achieve strong horizontally integrated cooperatives. Farmers were quick to see that they must form large powerful organizations themselves if they were to be free from domination by powerful business interests. The Grangers in the 70's and the Farmers Alliancemen of the 80's tried to form state and regional cooperative federations, but were thwarted by economic and social obstacles. Many attempts were made to form effective cooperative marketing federations before the California Fruit Growers' Exchange finally demonstrated about 1905 how this could be done.[12] Detailed attention cannot be given to the early experience of this organization, which gradually knit together for marketing purposes the majority of all California citrus growers. The first step toward integration was taken when growers formed themselves into local associations. These joined

[11] *Legal Status of Agricultural Cooperation*, (1927), p. 135.

[12] Although the Exchange was started under a different name in 1893, following several futile experiments in federation, it was not until about 1905 that it was firmly established.

together in district exchanges which, in turn, united to form one central coordinating organization. The unification or integration of the system was strengthened by use of contractual arrangements which achieved uniformity of essential operations throughout the system. The growers, coordinated in this way, were able to regulate shipments to wholesale markets throughout the nation and perform many other services of great economic benefit for themselves. To take one illustration, the horizontal integration of the citrus growers made possible the standardization of product essential for an effective advertising program.

The success of the California Fruit Growers Exchange in integrating horizontally, and to a substantial degree vertically, gradually encouraged the formation of other cooperative marketing federations of the same general pattern. This development went forward most rapidly in California, where highly specialized crops lent themselves to industry-wide organization, although excellent illustrations of similar horizontally integrated associations soon flourished in most agricultural areas of the United States.

About 1912 a new trend in horizontal integration came with the establishment of the California Associated Raisin Company, later renamed the Sun Maid Raisin Growers Association. This organization was not set up as a federation, but it aspired to have as members all raisin growers in California. While its main object was control of supply, it endeavored to integrate vertically upon a horizontal structure by also performing processing, merchandising, and similar functions.

The trend toward more horizontal integration was greatly speeded up by the favoring conditions which came with and which immediately followed World War I. Among the many large regional cooperatives of the present day then formed may be mentioned the Dairymen's League, the Land O'Lakes Creameries, and the central market livestock commission associations. Two of the largest purchasing regionals were also started at this time, but not as pure federations. The Eastern States Farmers' Exchange and the Cooperative Grange League Federation Exchange were organized primarily on a centralized pattern with direct membership, and their expansion has come largely by the addition of members rather than by the addition of associations. The objective of these organizations was to achieve the advantage of mass buying power and advantages in cost reduction through large volume operations.

In the early 1920's the idea of horizontal integration was vigorously promoted by Aaron Sapiro, who conceived of the organization of wheat growers, cotton growers, tobacco growers, potato growers, etc., into state, regional and national "commodity" organizations which would be powerful enough to achieve the advantages of monopoly control in marketing. Although this program presumed a certain degree of vertical integration, emphasis was placed on horizontal expansion to gain control of the supply. At the height of this development, about 1924, hundreds of thousands of farmers were members of organizations dedicated to "orderly marketing," the slogan of this movement.[13]

Although the experience of the Sapiro-promoted commodity marketing cooperatives demonstrated the weakness of the basic premises of monopoly control, the idea was taken up again in 1929 by the Federal Farm Board which endeavored to form strong national marketing federations or organizations of various types.[14] While some of the organizations which were then set up have survived in modified form, they gradually lost faith in the possibility of achieving the type of commodity control that gave them birth. At present large-scale cooperative organization has largely reverted to the pattern of federation for business efficiency purposes, as first developed by the California Fruit Growers Exchange.

Since 1933 the existing regional federations have added many local association members, and many new regional federated organizations have been formed. In fact, there are now few independent local associations, as most have found it desirable to join an existing regional federation. Moreover, many new local associations have been formed with the assistance of a federated organization with the understanding that they would become a segment of the already federated system.

In recent years groups of regional federations have made considerable progress in financing and operating "overhead" federations on a national or semi-national scale. These organizations may be thought of as federations of federations, although generally the overhead federation includes some member organizations of the centralized type. In the field of cooperative purchasing, United

[13] Sapiro's views on "orderly marketing" are examined in my study, *The Hard Winter Wheat Pools*, which carried the sub-title, "An Experiment in Agricultural Marketing Integration," 1933, p. 192 ff.

[14] For Farm Board position see statement by Board Member Carl Williams, *American Cooperation* (1932), pp. 77–79. This position was attacked by E. G. Nourse, pp. 80–93, and debated by the two, pp. 115 ff.

Cooperatives, Inc., National Cooperatives, Inc., and the National Farm Machinery Association, Inc., are organizations of this type. Somewhat comparable organizations in the field of cooperative marketing are the National Livestock Producers' Association, the National Federation of Grain Cooperatives, the National Cooperative Milk Producers' Federation, and the National Wool Marketing Corporation. The member associations in these national federations reach back to the farmers who own and control the primary cooperative units. Thus these national cooperative net-works horizontally and vertically integrate the marketing and procurement operations of the hundreds of thousands of farmers who are served.

Cooperative Methods of Horizontal Integration

It has been emphasized that horizontal integration by cooperatives takes place usually through the process of federation, rather than by outright merger. A federation is democratic in that a group of associations voluntarily place themselves for certain purposes under a common control. The members of the federation share in the benefits of the coordination through the flow of savings in accordance with patronage back from the central coordinating agency.

Federations vary greatly in the extent to which the member associations yield sovereignty to their central agency. Some member associations are reluctant to conform to a common pattern, while others operate as units of a homogeneous system. In some cases horizontal integration is strengthened by management or membership contracts which stipulate that all member units will perform certain functions in a similar way.

Cooperatives may also expand horizontally through the formation of centralized associations which unite members over a large area. For example, the Eastern States Farmers' Exchange which serves members over a nine-state area is obviously a horizontally expanded association, although its members are farmers rather than associations of farmers. This organization started in New England, but eventually extended its services into Pennsylvania, Maryland, and Delaware. Moreover, in each of the states served it has widened its membership basis by adding members.[15]

[15] The Exchange also is an excellent example of an organization which is integrated both horizontally and vertically. It not only serves members over a wide territory but it performs procurement, processing, and wholesale and retail distribution all under one common administrative control.

Although horizontal integration in cooperatives generally has come through federation of existing units or the addition of units to federations, or through the expansion of membership or territory in the case of centralized associations, there are many instances where several different local or regional associations have merged to form a new and stronger organization. The Cooperative Grange League Federation Exchange represents an outstanding instance of this type, for it was formed to unite the purchasing operations then being performed by three statewide farmers' organizations in New York State. The Farmers' Cooperative Exchange, likewise, was developed out of several less effective organizations to perform a unified cooperative purchasing service for the farmers of North Carolina.

A loose federation may thus represent a degree of horizontal integration, a strong federation a much higher degree, while a regional centralized association which has absorbed a number of like organizations may represent an even tighter form of horizontal integration, in that the centralized organization may control all aspects of local distribution as a means of serving its farmer members.

A pyramid of federations, from regional to national, all under the ultimate control of local associations and their members can also achieve through coordination a high degree of vertical integration, since the members at each state control the successive lateral integrations. Federation thus permits farmers to integrate their operations both horizontally and vertically and keep control of the integrated organizations so set up. In contrast, most non-cooperative integrated structures are controlled by the entrepreneurs who set them up, or by a small group of stockholders. It is frequently said that the federated cooperative is built from the *bottom up* rather than from the *top down*.[16]

[16] While it may be argued that the Board of Directors of a large federated cooperative like the California Fruit Growers' Exchange controls the integrated organization, each member of the Board is responsible to a district Exchange, and the Directors of the district exchange are responsible to the local associations, and the local directors are responsible to farmer members. There is thus a chain of control running from the farmer to the Directors of the Central Exchange. In contrast, such highly integrated non-cooperative business corporations as the General Motors Corporation, International Harvester Company, or Sears, Roebuck Company are largely controlled by directors who are responsible only to the mass of the stockholders. While it may be argued that this distinction is too finely drawn, it cannot be denied that there is a basic difference in the exercise of responsibility by those who control the two types of organizations.

Horizontal Integration plus Diversification

As cooperatives have built up strong horizontally integrated organizations, they frequently have increased their power by adding to their range of services. Such diversification expands the power of the horizontal integration. A large part of the cooperative expansion during recent years has come in this way, for new lines of service may help reduce overhead costs and increase membership satisfactions through providing savings over greater areas of service. Many purchasing associations were initially started to perform a specialized feed, seed, and fertilizer buying service, or a petroleum purchasing service; and federations were, in turn, organized to help them buy most effectively for their members. Later as these services were well developed, other lines such as farm machinery, lumber and equipment, were added. Likewise, many purchasing cooperatives have found it desirable to employ their management and facilities to perform marketing services required by their members, while marketing cooperatives have in a similar way expanded into purchasing or other services.

It has been more difficult to achieve the advantages of diversification in cooperative marketing than in cooperative purchasing, for agricultural products are largely produced by specializing farmers. Dairy, fruit, grain, and livestock farmers may have many common needs for supplies, but their products may require separate marketing machinery. However, cooperatives handling different products have often employed the same marketing organization, and many cooperative marketing associations have separate departments to facilitate the handling of such business. Frequently, regional federations employ the same sales agency. The California Fruit Exchange for many years utilized the sales force of the California Fruit Growers Exchange. Such organizations as the Land O'Lakes Creameries, the Challenge Cream and Butter Association, and the Calavo Growers have also found it advantageous to add complementary products to their product lines in order to serve better the needs of consumers and reduce overhead costs.

One of the problems of a cooperative association is to determine its optimum range of services and activities. In most organizations there is conflict between the advantages of more specialization or more diversification. Obviously a cooperative should not attempt to perform so many services as to perform none effectively. On the other hand, there may be as much danger of over-specialization

as of over-diversification, for if an organization limits its activities too closely it may forfeit important opportunities for cost reduction and limit its usefulness to its members. Moreover, it may fall behind in the competitive struggle with more strongly integrated and diversified organizations and thus endanger its own survival.[17]

As an organization diversifies, it may become more difficult to integrate operations vertically except where this can be done for selected supplies or products. Such functions as advertising, research, and cost accounting may be adapted to the needs of a diversified organization, while raw materials procurement and manufacturing would be ill-advised, except for a few major lines. A cooperative purchasing federation may properly undertake manufacturing for a few supplies handled in great quantity, but it would lead to chaos if an attempt were made to manufacture everything that might profitably be distributed. In general, most cooperative success in vertical integration by means of manufacturing or processing has come where supplies or products in considerable volumes are handled by an association.[18]

Stages of Cooperative Expansion

The history of cooperative development shows that generally expansion first takes place horizontally through federation of like units, be they individuals or local cooperative associations.[19] As volume is built up, sufficient for large-scale operations, it is possible to strengthen the power of the organization through broadening its services by diversification, or by expanding vertically to take on such functions as wholesaling, transportation, research, advertising, processing, or manufacturing. As the efficiency of the organization is increased by vertical integration the advantages of membership

[17] See discussion of "Specialization or Integration?" by Henry H. Bakken and Marvin A. Schaars, in their *Economics of Cooperative Marketing*, 1927, pp. 194–196.

[18] The slogan "Factories are free," employed by some cooperatives to dramatize the fact that plant costs are usually covered in prices charged for services and commodities, is dangerous if not fully understood. Not every factory is economically desirable. White elephants have to be paid for by somebody. On this general question the views of James A. McConnell, General Manager of the Cooperative Grange League Federation Exchange, are of interest: "My own experience leads me to the general conclusion that we should go into manufacturing or processing only to the extent that is necessary to make purchasing effective. . . . Manufacturing should be an implement of purchasing and not be allowed to distort the purchasing pattern." *American Cooperation*, 1949, pp. 180–184.

[19] It should be recognized that at least some vertical integration is also present—even at this primary stage.

are increased and more members are added, thus resulting in more horizontal integration.[20]

The question of whether to expand *horizontally* or *vertically* at any given time depends upon many things, such as stage of development, availability of capital, management ability, membership understanding, and organizational structure. Generally, as cooperatives strengthen their power as mass buyers or mass sellers through horizontal integrations, they will be able to engage in significant expansions vertically, either backward or forward, for they can then manufacture, process or perform other functions with an assured volume back of them.[21] Thus, vertical integration can be considered a second, or higher, stage of integration and an intensification of effort built upon an extension of operations horizontally.[22]

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[20] Dr. Joseph J. Spengler of Duke University is of the opinion "that the two forms of integration tend to go together because an over or under capacity at one level will require an adjustment at one or more other levels. I suppose that those concerns that deal directly with the consumers probably are more integrated horizontally than vertically in the sense that they probably have relatively more capital involved at the horizontal level than at the various levels below the horizontal consumers' oriented level. . . . It is my impression that the cooperatives have gone further in horizontal than in vertical integration because as a rule they have been able to have done for them economically the things they would do for themselves as they expanded vertically" (letter of March 4, 1950). In their penetrating study, *Consumers Cooperation in Great Britain*, (1938) Professors A. M. Carr-Saunders, P. Sargent Florence and Robert Peers point out that: "The history of cooperation in this country indicates the way in which expansion tends to take place. The first and most obvious form may be described as horizontal and it operates in two ways. In the first place, more and more consumers are brought into the movement and its resources and influence thereby automatically increase; and in the second place the range of commodities with which it is concerned is progressively extended and the proportion [bought by] existing members increases. These two aspects of expansion are of course complementary." They go on to refer to the addition of vertical integration as being perhaps an even more significant development. It is their view that chronologically horizontal expansion usually sets the stage for vertical expansion, although the latter may, in turn, set the stage for more horizontal expansion.

[21] In some instances, vertical integration may be necessary to protect sources of supplies, or assure access to markets. Sometimes a limited degree of such integration will serve as a safety valve for protection in times of emergency, such as during a seller's market, and achieve most of the advantage, with little of the cost, of more complete vertical integration. For illustration, the Fruit Growers Supply Company acquired a timber reserve and box shook mills about 1910 to manufacture box shook when supplies from commercial sources were exorbitantly priced. Since then it has produced an increasingly larger proportion of the supply for its own needs.

[22] In farm economics parlance, horizontal integration may roughly be compared with expansion of land in a farm to permit "extensive cultivation," and vertical integration to expansion through the application of more resources to a given amount of land on a farm, i.e., "intensive cultivation."

The Future of Cooperative Expansion—Horizontally

The trend toward more integration, both horizontal and vertical, is irresistible among cooperatives as long as our economy is largely dominated by large-scale industrial organizations. Since only by integration can cooperatives offer effective competition to powerful integrated non-cooperative firms, it follows that unless the cooperatives can subordinate their differences sufficiently to create comparable integrated concerns, their role in the future business life of the nation will be secondary. On the other hand, if they can find how to integrate progressively both horizontally and vertically, they will be able to exert a much stronger influence in economic affairs.

It is axiomatic that horizontal integration is necessary to permit full exploitation of the concept of vertical integration, for it is only when purchasing cooperatives together form a dependable market that they can produce effectively for this certain market. Likewise, when they have control of the marketing of large volumes of product they are then able economically to process and carry the product forward toward the final consumer.

In one respect the process of horizontal integration has come to a slowing-down stage, for most local cooperatives have now been gathered into existing regional federations. However, there are many areas and communities not now served by cooperatives where new associations may be formed, which, in turn, could be brought into existing federations. Since there is still a great amount of competition between cooperatives which is resulting in wasteful duplication and unjustifiably high costs, we may also expect some degree of merger among existing federations or centralized associations to avoid "overlapping" and to achieve greater operating efficiency.

While some degree of informal coordination may help on this problem, it is believed that its full solution will eventually call for the outright merger of competing cooperatives which perform similar services in the same general areas. The extent of such amalgamation will no doubt depend upon the effectiveness of competition from non-cooperative enterprises and the degree of self-effacing leadership within the competing cooperatives.[23]

[23] For more complete discussion see my article, "Competition Between Cooperatives: Meeting the Problem," *American Cooperation 1949*, pp. 341–366.

Thus cooperatives have arrived at a stage of refinement in horizontal expansions. From now on the process of integrating horizontally no doubt will be based more on the use of business judgment and careful economic and membership analysis than in the past, when integration could be largely accomplished by the simple process of adding together relatively small non-competitive units.

Since horizontal integration at the local level is largely accomplished, except in many areas where local associations might be advantageously combined to achieve economies of scale,[24] the significant opportunities for horizontal integration in the future probably will be at the central or national market levels. If purchasing cooperatives are to assemble the capital necessary for crude oil discovery, production, and refining; production of phosphate and potash; and farm machinery manufacture, etc., necessary to meet the power of their integrated competitors, they will need to join together in widening circles to tap the resources and custom of larger aggregations of members. Likewise, it is becoming evident that relatively isolated cooperative marketing units must find ways of working together in larger groupings if they are to meet the competition of highly integrated giant food concerns.

In looking into the future it should be recognized that the ability to achieve effective integration within cooperative circles does not depend upon economic considerations alone. Cooperative associations have definite personalities and it is sometimes almost impossible for them to integrate for the economic good of their own members. Studies may show the need—or opportunity—for integration, but the unwillingness to subordinate personal or organizational interests may prevent real integration of an effective sort. It is believed that this problem will be solved only when members, and especially the directors who represent them, come to have a better knowledge of the economic factors which are essential to cooperative success.

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[24] The Farm Credit Administration has made a number of studies which show how local cooperatives could be advantageously combined to reduce operating costs and increase efficiency. For example, a recent "analysis of packing house costs for 31 Southern California Citrus Associations" indicates that four local packing houses could reduce average per box packing expense trom 95 to 85 cents if all of the fruit were handled by one large packing house. Similar conditions prevail among cooperative creameries, elevators, and other types of local cooperative associations.

See also R. G. Bressler, Jr., *Economies of Scale in the Operation of Country Milk Plants*, The New England Research Council on Marketing and Food Supply, *et al.* (1942).

Concluding Observations

1. The process of integration—both horizontally and vertically—has been going on as an attribute of cooperative expansion since the first cooperative association was formed.

2. The first stage of cooperative expansion is horizontal, although a certain degree of vertical integration is associated with the horizontal expansion.

3. It is more difficult to achieve integration by cooperatives than by non-cooperative corporations, for the latter have greater flexibility in decision making. However, cooperatives have found out how they can make effective use of the process.

4. Horizontal integration in cooperatives usually is achieved through federation, i.e., by the formation of an association to unite separate associations. The process of federation invariably brings with it a certain degree of vertical integration, for new functions are performed by the overhead association for the benefit of the integrated units.

5. Horizontal integration by cooperatives has been carried farther than vertical integration. However, at present there appears to be a greater need and opportunity for more horizontal than for more vertical integration. Until the process of working together—that is, coordinating horizontally—is carried further, many cooperatives cannot proceed advantageously with vertical integration.

6. A strong horizontally integrated cooperative marketing or purchasing cooperative should protect itself by achieving a certain degree of vertical integration. For example, a horizontally integrated cooperative distributive system may find it necessary to integrate vertically so as to protect itself during periods of seller's markets. Moreover, there may be outright advantages from vertical integration in control of quality of product.

7. Many cooperatives have endeavored to integrate vertically when greater returns could be derived from intensification of present activities. Diversification is an attribute of horizontal integration. It is like adding more power on existing transmission lines. Excessive vertical integration may involve heavy investment and more complex management decisions and may limit flexibility of operations.

8. Horizontal integration has had its greatest development in regional federated organizations. As the area covered extends, problems of administration become more difficult. If the regional

purchasing associations could better integrate their petroleum, feed, fertilizer or farm machinery operations horizontally, it would make possible greater achievements in vertical integration through raw materials procurement, manufacturing, distribution, and research.

9. Concentration on horizontal integration alone may become a fetish, and keep organizations from undertaking vertical expansions that would prove highly beneficial. Both horizontal and vertical integration are tools for expansion. Frequently, they can be used together like a shovel and a pick.

10. More research work is needed in the field of horizontal and vertical integration. Case studies of organizations and groups of organizations are needed to determine economies of scale, overhead costs, the optimum size for management, conditions essential for democratic control, and legal or structural limitations. Information is especially needed on how far integration should be carried in specific circumstances and how it can best be achieved within the cooperative framework. Also, more information is needed on the extent to which integration by cooperatives, as well as by non-cooperative organizations, is in the interest of desirable public policy.

VERTICAL INTEGRATION OF AGRICULTURAL COOPERATIVES

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VERTICAL integration has been an increasingly important factor in the continued expansion of agricultural cooperatives in the last fifty years. Just how much of the growth of cooperatives is explained by vertical integration is not readily determinable since it is intermingled with growth arising from horizontal integration, the addition of other commodity lines and other factors.

Further vertical expansion of agricultural cooperatives of all types has had a considerable appeal to agricultural producers and cooperative management as a means of extending the influence and control of these organizations and as a means of augmenting the net returns of farmers. Agricultural economists and other students of the problems of agriculture have expressed considerable interest in further vertical integration as an approach in improving agricultural production and marketing. Indicative of this viewpoint is Professor J. D. Black's address to a marketing conference in 1947 in which he urged concentration on better integration of marketing as a means of organizing marketing along more efficient lines.[1]

In view of the interest of agricultural producers and other groups in vertical integration, it is desirable to give further consideration to some of the economic aspects and problems involved in the use of this technique by agricultural cooperatives.

What is Vertical Integration?

A review of the literature reveals many definitions of the concept of vertical integration of business organizations. For purposes of this discussion we may consider vertical integration to be a combination of business units, each at successive stages in a chain of productive operations for a commodity, into one firm and under one managerial control. It should be noted that the combination is of business units which come one after another in the successive stages or levels, in the series of operations through which a commodity moves from the primary producer to the consumer. This

[1] Black, J. D., "Guideposts for a Marketing Program," *this Journal*, Vol. 29, No. 3, August 1947, p. 626.

type of integration should be contrasted with horizontal integration, in which the combination is of business units handling similar commodities at the same stage in the producer to consumer chain.

A simple illustration of vertical integration in agriculture is that of a local milk producer who has acquired control of retail distributing facilities for his product. Another more complex illustration of this technique is that of middlewestern farmers who, through their cooperatives, have brought under one control petroleum supply operations extending through the various stages of retail and wholesale distribution, transportation, refining, and ownership of oil producing properties.

Vertical integration is described as being forward when it is initiated at or near the raw material stage of production and is extended toward the finished product and the ultimate consumer. Agricultural marketing cooperatives, such as Land O'Lakes Creameries and California Fruit Growers Exchange, which control some or all of the various productive stages in the producer to market chain, are illustrative of this type. Backward vertical integration exists when it is initiated at or near the consumer level and is extended toward the raw material level. Agricultural purchasing cooperatives, such as Southern States Cooperatives, Inc., and others, which have brought various productive units extending from the farm to the fertilizer factory, to the refinery, to the oil well, and to other sources of basic raw materials for farm supplies, under a single managerial control are of this type. Our large chain store systems are also good illustrations.

It should be noted that vertical integration is not always of the so-called simple or pure type, that is, of a firm handling a single product, or very similar products, over successive levels in the producer to market chain. For instance, vertical integration often is effected on the basis of a number of different, or complementary, products handled over successive levels by a given firm. Also, joint horizontal and vertical integration may be effected in one firm. Many cases of integrated firms involve combinations of vertical, horizontal, and complementary integration.[2]

It should be pointed out that a farm which has membership in a cooperative is part of a vertically integrated unit. The farm is

[2] W. Z. Hirsch has defined carefully these various combination types of integration. See "The Economics of Integration in Agricultural Marketing," Ph.D. thesis (University of California), pp. 35–38.

the production level from which integration is initiated forward toward the market in the case of membership in marketing cooperatives, and backward toward raw material for farm supplies in the case of purchasing cooperatives.

While there are many illustrations of vertical integration in agriculture, there is relatively little statistical material as to the extent to which farmers have carried this type of expansion. Annual data are available as to the total volume of business of farmers' marketing and purchasing cooperatives. For the crop year 1947–48 the estimated volume totalled $8.6 billion.[3] Of this total, $7.2 billion was the estimated volume of business of marketing cooperatives and $1.4 billion that of purchasing associations. These data indicate the approximate extent of vertical integration from the farm business level to the various production and market levels beyond. However, these data provide no information as to the proportion of the business handled at the successive levels beyond the farm, that is, at the local processing, wholesale, jobbing, retail, or other levels in the chain from producers to consumers.

Another somewhat less precise measure of the extent of vertical integration by means of agricultural cooperatives is the investment which various integrating units have in the stage of production or marketing ahead. This method of measuring the degree of vertical integration obviously has many imperfections which we do not have time to discuss here. On this basis we find that farmers in the United States had $2,036 billion invested in their cooperatives as of January 1, 1949 as compared with $660 million in 1936.[4] These figures include the total investment which farmers had in their cooperatives at all levels of integration; but again, they do not indicate how much at each level.

A somewhat similar analysis of the inter-cooperative investment accounts of a representative sample of 1,053 farmers' cooperatives in the United States was made for the fiscal years 1936 and 1945.[5] In this study it was found that in 1945 these cooperatives had an average investment of $23,200 per association in other cooperatives,

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[3] Grace Wanstall, *Statistics of Farmers' Marketing and Purchasing Cooperatives 1947–48*, Farm Credit Administration, Misc. Report 137, March 1950, p. 7.

[4] Roy J. Burroughs, "Uses and Misuses of the Balance Sheet of Agriculture," *Agricultural Finance Review*, Vol. 12, November 1949, pp. 22–32.

[5] Data from a study of the financing of farmers' cooperatives now in progress in the National Bureau of Economic Research, New York.

usually in production or distribution stages ahead. In 1936 these investments averaged $9,600 in each association. Illustrative of the inter-cooperative investment procedure, local farm purchasing cooperatives often hold investments in regional wholesale cooperatives. The regional wholesalers, in turn, have investments reflecting participation in the financing of fertilizer plants, oil refineries, or other productive facilities reaching back to the raw materials stage. It should be recognized that a limited part of the change in the above averages is due to price level changes. However, in the absence of better data these averages give us a rough approximation of the degree of vertical expansion of these associations in this period.

For marketing associations alone, the increase in inter-cooperative investments was from an average of $12,100 in 1936 to $18,300 in 1945. In purchasing associations average investment accounts increased from $3,000 to $36,500 in this period, reflecting the large increase in vertical expansion at all levels in many farm supply fields including petroleum, feeds, fertilizers and others.

There is other evidence of vertical integration in many agricultural activities. Such development has been particularly extensive in supplying farm petroleum needs. The Cooperative Research and Service Division of the Farm Credit Administration reports that in 1949 some 1,962 local associations handling petroleum were being served by 28 regional wholesale cooperatives. The first cooperative refinery was built in 1939, but by the close of 1949 twenty refineries were owned by 14 regional wholesale organizations. Some of the refineries own pipelines for transporting crude oil to them and one has over 200 miles of lines for moving finished products to a terminal. Most of the refineries own from five to 10 percent of their crude oil requirements, the final step in petroleum integration.

Some of the other fields of activity in which there has been considerable vertical integration by means of cooperatives in recent years include fertilizers, feeds, farm machinery, cottonseed and soybean processing, grain storage, grain terminal operations, some manufactured dairy products, and frozen foods. While we observe this current progress, we should not lose sight of the substantial progress in vertical integration which was made over many years by older groups in nearly all fields of cooperative marketing.

Why Vertical Integration?

A basic consideration which has induced farmers to integrate vertically through their cooperative organizations is the economic nature of the farm business unit. The typical farm is a small-scale business unit or firm which is usually too small to achieve the advantages of vertical integration by itself. Entry of such a unit into additional marketing or purchasing activities requiring specialized equipment and services would not be economical since an optimum scale of business could not be achieved at the respective levels of operation. By joining with other farm units in the community (horizontal combination) to form a cooperative, farmers have been able to obtain some of the economies associated with vertical integration.

Farmers also recognize that as small business units they have little or no influence on the prices of the commodities they sell or the prices of the supplies they buy. To overcome some of the disadvantages of an atomistically competitive industry in markets characterized by large-scale firms, imperfect competition, monopoly controls, and occasional unfair trade practices, farmers have combined their forces in their cooperative organizations.

The general objective which farmers have in mind in vertically integrating their business by means of agricultural cooperatives is that of deriving maximum profits from their business operations. There are a number of sources from which the gains of vertical integration may be derived. Let us review some of these very briefly.

One of the more important economies of vertical integration is that a number of the successive selling costs, buying costs, and other handling charges normally incurred in transferring commodities from firm to firm at the different levels on the way to market may be eliminated. In other words, by streamlining the marketing system some of the duplications and competitive wastes of marketing may be avoided.

Vertical integration enables many firms to effect a more complete utilization of the productive factors employed and thus reduces costs. Because of its larger scale a vertically integrated firm may utilize its management, other specialized personnel, plant and equipment and other factors more fully. A greater division of labor at the different levels of the production-marketing chain may be achieved.

Because it is in a position to buy more units of given productive factors at a time, the large integrated firm's bargaining power is enhanced and in consequence unit factor prices may be reduced.

Another gain of vertical integration, frequently cited, is the opportunity to absorb middlemen's profits. Assumption of the functions of middlemen may result, of course, not only in the absorption of profits but of some losses as well.

An important advantage of vertical integration is that production or distribution at one stage can be adjusted more closely to the needs of other stages. Successive production processes can be performed more efficiently since the types, qualities, and quantities of supplies can be coordinated more accurately with needs. The marketing cooperatives which are integrated to sell more closely to the ultimate consumer will be in a position to obtain a better picture of consumer preferences. They may obtain a better recognition of the effects of quality on price and thereby provide farmers with incentives to improve quality. Through an integrated organization producers may derive more of the gains from superior quality products, special services, and branded products. Gains of product differentiation may be achieved. Similarly in the case of purchasing cooperatives, the composition and qualities of farm supplies can be adjusted more closely to the specific needs of farmers as is being demonstrated in the formula emphasis in the sale of feeds, fertilizers, and other supplies.

More complete vertical integration of many agricultural markets may facilitate the flow of farm commodities from producers to consumers. In such a market system the price adjustments needed to move products through market channels more promptly can be made without delay. So often prices in the consumer markets do not reflect quickly and adequately conditions in the producer markets. The loose links in an unintegrated marketing system may take up much of the slack of an initial price adjustment. The sharp decline in some dairy product prices at the producer and wholesale level in the first half of 1949, while retail prices responded but little and belatedly, illustrates the problem.

Vertical integration also may be undertaken for additional reasons to those discussed above. Elimination of competition, enhancement of monopoly powers, assurance of raw material supplies are among the other reasons for the use of this technique.

How Far to Integrate?

Undoubtedly, the principal problem in the consideration of vertical integration in agriculture is that of determining how far or to what extent farmers should carry the integrating process. What are the economic conditions which determine how far vertical integration may be carried to advantage?

As was indicated earlier, it is assumed that the objective farmers and their cooperatives have in mind in extending their business operations by means of vertical integration is that of maximizing their net returns. It is recognized that farmers and their cooperatives also may have other motives in expanding vertically. Fundamentally, however, cooperative business goals are not at variance with the objectives and principles of ordinary business firms in their aim to maximize net returns.

The basic analysis, then, by which a cooperative may determine how far to expand its operations vertically to achieve profit maximization is the familiar one of seeking the point at which marginal costs and marginal revenues are equated. In making this calculation cooperative management confronts the same difficulties as other business management in obtaining the statistical data and other information needed. In determining how far vertical expansion may be carried cooperative management should give more careful consideration than they have in the past to the elements of the marginal analysis.

Formal theoretical treatment of the degree to which vertical integration of a firm may be carried has received only limited consideration in the economic literature. One of the most comprehensive and thorough theoretical studies of vertical integration in agriculture is that recently completed by Hirsch of California.[6] Briefly reviewed, his methodology consists of dividing the general phenomenon of integration into sub-groups for purposes of definition and consideration of economic implications. The two fundamental types of integration—horizontal and vertical—are considered separately. As the analysis proceeds these types are supplemented by complementarity and other more complex types are introduced.

In his theoretical analysis Hirsch considers the conditions for output and price determination (assuming profit maximization) of the various types of integration. The effect which the various

[6] Hirsch, *op. cit.*

types have on cost, supply and demand functions of a particular commodity, and the bearing these factors have on the determination of output and price are analyzed in turn. As may be seen, the number of cases, or theoretical models, are very numerous.

Let us consider briefly one of Hirsch's simpler models for a vertically integrated firm.[7] This model derives the necessary conditions under which a vertically integrated firm, handling a single commodity, will maximize its profits. In this case the firm integrates three levels of the production-marketing process, namely, the producer, wholesaler, and retailer levels. It is assumed that: "(a) Markups, or charges for performing marketing functions, on each respective marketing level are zero. (b) No factor or service payments are made to another firm by any part of the vertically integrated firm except by the production department. (c) All departments of the vertically integrated firm handle the same volume per time unit." With reference to this case Hirsch concludes, "It can be shown that such a firm will maximize its profits by handling a volume which equates the marginal revenue of the retail department with the marginal cost of the production department. Under the same assumptions a firm which integrates in levels of the production and marketing process will, in order to maximize its profits, handle that volume which equates the marginal revenue of the level closest to the ultimate consumer with the marginal cost of the level farthest removed from him. This may be considered the general condition for profit maximization under vertical integration."

Hirsch's over-all conclusions to his study of integration in agricultural marketing point up some of the desirable effects which may be expected from further integration, including vertical integration. They are: "Introduction and expansion of various types of integration by agricultural marketing cooperatives may well maintain active and keen competition in most agricultural industries. Indications are that with further cooperative integration, production and supply of agricultural commodities will be heavy and stable. This appears to be consistent with relatively low prices to consumers, relatively low marketing costs and margins, and perhaps smaller unit profits, but larger total profits to farmers."[8]

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[7] See Hirsch, *op. cit.*, pp. 98–102.
[8] Hirsch, *op. cit.*, p. 3.

While the theoretical analysis provides a useful guide in determining how far agricultural cooperatives may go in vertical expansion under certain conditions, there are some other considerations which need special attention. Each cooperative group contemplating this type of expansion should analyze its situation carefully and observe with particular care its capacities and facilities for vertical integration.

A fundamental consideration for a cooperative planning to enter additional stages of the production-marketing (or purchasing) process is that it must have an adequate volume of business to support the program. In their anxiety to move ahead, to gain control of market outlets or sources of supply, many associations have neglected this point. In most cases a relatively large volume is necessary for efficient operation and to keep per unit costs down at the respective levels of operation. This is particularly essential if extensive entry into larger national markets is planned. Before extending their activities to additional levels of vertical integration, producer groups may well weigh if first they should not go further in horizontal integration in order to obtain the necessary volume. The historical pattern of integration is that considerable horizontal integration usually precedes action of the vertical type. In this connection, it may be pointed out that in some commodity lines a number of regional cooperatives have coordinated their activities to combine the volume of business and capital needed to expand vertically. The coordination of regional purchasing cooperatives in the Middlewest to acquire oil refineries, oil well properties, fertilizer plants, as well as other sources of supplies illustrates this action.

Another important consideration in determining how far farmers' cooperatives should go in integration is the capacity of their management, both present and potential. With each new step up the vertical integration ladder, management will be required to enter into new and often more complex activities requiring additional knowledge and skills. Greater managerial ability will be needed to coordinate these multiple activities than is the case in a specialized one-stage marketing or purchasing organization. Many cooperatives have made the mistake of spreading their management thin by integrating too far and before they were ready for it. As a result many of the expected economies of integration have not materialized.

The ability to finance the venture and to assume the risks involved is still another factor which has an important bearing on the extent to which a cooperative should go in vertical integration. An integrated firm requires more capital for both facilities and operating capital purposes. The more stages through which products are followed to market, the longer will be the time between delivery of products by the farmer and the receipt of the returns. More capital will be required to finance these products over the lengthening market interval. Acquisition of adequate supplies of capital is difficult and slow in most cooperatives for reasons we do not need to elaborate here. In view of this, the rate of integration should not exceed the ability to finance.

The status of membership relations also must be considered in determining how far a cooperative may integrate. The readiness of members in going along with the expansion by using the services which the cooperative proposes to make available is important if the larger volume which is needed is to be obtained. In working out effective sales programs which extend further marketward, local members and local groups often have to relinquish some of their autonomy in favor of the larger program. This is not always easy to achieve because of the suspicions of some local members that others in the enlarged organization are getting a better deal. A carefully planned membership program which tells how the integration process works will be important in determining how far the organization can integrate successfully.

A further observation on how far farmers need to go in vertical integration is pertinent. Many have assumed that only one hundred percent integration can be effective. In some cases this may be necessary, but in many situations a 20, 30, or a 50 percent degree of integration may give all the advantages needed and unnecessary risks may be avoided. The experience of some of our successful national chain store organizations which have limited vertical integration to those levels where they needed controls and economies illustrates the point.

Thus, in trying to determine how far a cooperative should go in vertically integrating its operations it is necessary to make a thorough analysis of the situation in which the organization finds itself in each case. The theoretical framework in which the analysis should be conducted is the familiar marginal analysis involving a study of marginal revenues and marginal costs. The many variables

affecting both costs and revenues will need to be considered. The situation with regard to the available volume of business, capacity of management, financing, market conditions, and other factors of the working economy in which the cooperative operates also needs to be weighed. As an aid in making such an analysis the importance of sound research as a tool cannot be emphasized enough. Cooperatives will need to place increasingly greater reliance on market and economic research as they move further into vertical integration.

Ample opportunities exist to improve agricultural marketing and purchasing by means of more vertical integration. This is true in spite of some of the limitations and problems which have been discussed. Further use of integration techniques by our agricultural cooperatives can play a very significant role in improving the economic position of farmers. Sensational results should not be expected, but steady substantial benefits may be achieved by this means. Further integration is an approach to some of the problems of agriculture which warrants further study and encouragement.

DISCUSSION

WERNER Z. HIRSCH
University of California

One aspect of cooperative marketing appears to deserve special attention —the relation of cooperative marketing and public welfare. Horizontal integration and vertical integration are often viewed with alarm, because they augment the firm's economic power. Integration by farmers, however, appears to lead to a more limited increase in monopoly power than integration in any other sector of the economy. Among the important factors which make for this difference the following may be cited: (1) the almost unrestricted freedom of entry into most agricultural industries as well as their intimate dependence on nature; (2) the relative abundance of substitutes for most farm products; (3) the difficulty of establishing regional or nation wide cooperatives because of the divergence of interest of farmers in different areas; and (4) the cooperatives' limited control over output. Squeezes of suppliers and purchasers which operate on the local or wholesale level are further made difficult because of their relative strength in bargaining power. In a sense some of these considerations as well as others may justify the differential treatment accruing to farmers' cooperatives under the law.

Nevertheless, by integrating their functions horizontally, farmers change from a group of individual units into a local, regional, or even nation-wide monopoly of varying degree as far as marketing is concerned. In this respect I am in slight disagreement with Dr. Knapp's concluding observation [*omit-*

ted in printed version], in which he states that "the achievement of monopoly power by the process of horizontal integration by cooperatives is negligible without state support." Our disagreement is mainly one of emphasis. A few examples will help to illustrate my point. Between 1913 and 1931, i.e., much before the initiation of state support, the California Almond Growers Exchange handled on the average about 66 percent of all United States almonds annually. The California Fruit Growers Exchange has been handling around 80 percent of all United States lemons for several decades. In the 1923–24 season this cooperative initiated a voluntary lemon marketing agreement and for many years since has been preventing 20 to 35 percent of the annual lemon crop from reaching the fresh fruit market. During the 1930's the California Walnut Growers Association, the American Cranberry Exchange, the California Lima Bean Association, and the Calavo Growers of California handled about 80, 60, 60, and 55 percent, respectively, of this country's production of their particular crops. There can be little doubt that these cooperatives have attained a considerable degree of monopoly power. The California Almond Growers Exchange, the California Walnut Growers Association and the California Lima Bean Association have attained their position almost exclusively by horizontal integration. These are a few examples of indications of nation-wide monopoly power. The number of horizontally integrated cooperatives with local monopoly power is certainly even greater.

To the extent that the cooperators produce a crop the production of which is geographically centralized, and bestow upon their management the right and duty to formulate and implement broad policies, and to the extent that the cooperative neither incurs large scale economies nor achieves substantial increases in the public's desire for its product, horizontal integration is apt to lead to both restrictive practices and higher prices. Few people consider such phenomena consistent with public welfare unless they are more than compensated for by accompanying desirable features.

It is, however, an historical fact that horizontal integration is usually followed by vertical integration, because apparently a substantial business volume is needed before vertical integration proves profitable. This development is particularly common to the dairy, egg, poultry, turkey, citrus, and avocado industries. Interestingly enough, forward vertical integration under certain conditions appears to be able to counteract and in part offset the restrictive high price tendencies brought about by horizontal integration.

In order to prove this contention it is convenient to resort to a comparison of profit maximizing equilibria prior to and after initiation of vertical integration. For this purpose it is not necessary to assume that the cooperative will reach such an equilibrium, but that it is profit geared, and that vertical integration does not affect the degree to which it is profit geared. In this sense the conventional equilibrium constitutes a tendency in which direction the firm would tend to move.

It is important to note that whenever vertical integration results in cost reductions it will tend to increase output. Economies which result from

vertical integration appear by no means uncommon. They will shift the marginal cost function to the right and lead to an intersection with marginal revenue at a larger volume. It should be understood that this output increasing tendency will exist irrespective of the way markups and payments are handled by the firm. Naturally volume would tend to be even larger if the cooperative not only incurs economies of integration but also meets the markup and payment conditions. It should be pointed out, however, that there is no assurance that as a result of successful forward vertical integration the cooperative would sell a volume equal to the competitive one, i.e., the volume prior to the initiation of horizontal and vertical integration. In a general way it can be stated that depending on whether the integrated firm's marginal production cost function is horizontal or sloped, whether net economies of integration are incurred, and whether integration leads to an upward demand shift, the cooperative may approximate the same volume supplied prior to the formation of the cooperative and in some instances it may even exceed it. And, whenever vertical integration is associated with economies of integration, but not with price effects, the increased volume will also result in lower prices.

To summarize, although horizontal integration and vertical integration in the form of agricultural marketing cooperatives lead to an increase in monopoly power, in the majority of cases this increase appears to be only a limited one. In many cases vertical integration is likely to counteract restrictive high price tendencies while at the same time it further enhances the position of the farmer.

DISCUSSION

E. A. PERREGAUX
University of Connecticut

Professor Erdman has discussed the topic largely from the case method approach. It would seem desirable to give more attention to the trends from the legal, financial, organizational, and operational points of view with their effects on the expansion of agricultural cooperatives.

The passage of the Capper-Volstead Act is mentioned but inadequate consideration is given to its implications. While the U. S. Bureau of Markets is mentioned, no reference is made to the Cooperative Research and Service Division of the Farm Credit Administration either in terms of what its creation in 1926 by Act of Congress implied as a matter of public policy, or in the work of the Division in assisting farm cooperatives through education, research, and service work. The passage of the "Farm Board" Act is only mentioned in passing without its place in continuing the monopolistic concept of cooperative marketing being discussed. The Banks for Cooperatives and their contribution to the expansion of farmer cooperatives warrants attention.

Another development in federal law which he did not include was that regarding the taxation of cooperatives. Many people believe that agricultural cooperatives have been able to make their growth in recent years be-

cause of the provisions of 101 (12) of the Internal Revenue Act. This advantage is more illusory than real, and the fact that about 50 percent of the cooperatives never chose to qualify for tax exemption, and that others who qualified are giving it up, indicates that this is a field worthy of more critical evaluation than has been given to it by students of cooperation.

Another trend since 1900 that Professor Erdman does not mention is the passage of one or more state laws in almost every state in the Union. Some of the states have passed several laws providing for different types of associations. These were adopted over a period of years and varied considerably according to the cooperative philosophy of the leaders of the time.

One other phase that would seem to deserve more attention is that of the place of the cooperative as "an instrumentality of the state." Professor Erdman mentioned briefly this characteristic in the milk organizations but he does not refer to the other agencies such as the Farm Credit Administration (outside of the Banks for Cooperatives), the Rural Electrification Administration, and the government price supporting operations carried out with and through cooperative associations.

In many other countries of the world a cooperative is that in name only. It is really an instrumentality of the state. However, in the United States control of the associations has remained largely in the hands of the members.

While the marketing activities of the Farm Bureau are mentioned, no reference is made to the development of the large cooperative purchasing associations in the Midwest which were an outgrowth of its activities.

In reading Professor Erdman's paper one would not get too complete a picture of the many and various services farmers have provided themselves through cooperative action. Among those of recent origin not mentioned are artificial breeding associations, farm machinery manufacturing, and oil processing operations.

He also does not mention the auxiliary organizations formed and supported by the farm cooperatives. Among these would be the National Milk Producers Federation, the National Council of Farmer Cooperatives, and the American Institute of Cooperation, to name a few.

I am not sure that I would agree with his periods of development nor would I attribute as much influence in the development of cooperatives to President Theodore Roosevelt. It would seem that the monopolistic control and the iron clad long term contract advocated by Sapiro was significant and was carried over by the Farm Board. This philosophy has changed among cooperative leaders since that time.

Another trend that cannot be overlooked is that of increased recognition of the need for more accurate accounting terminology in describing the operation of cooperatives. The adoption of ordinary business terms which do not describe accurately their methods of doing business has resulted in much misunderstanding that could have been avoided if appropriate terminology had been used.

Certainly I would agree that the development of the revolving fund basis for capitalization has been responsible for some of the expansion and

that on a sound basis. The feature of the early revolving capital plans for regular repayment has been replaced by the sounder plan of repayment when the association had adequate capital and could start revolving it.

DISCUSSION

FRANK ROBOTKA
Iowa State College

As for the general topic for this morning's program, "Fifty years of Agricultural Cooperation," a critical economic appraisal or interpretation of significant aspects of agricultural cooperative developments of the past 50 years should be of considerable interest. However, there are many questions on the frontiers of cooperative theory and practice, a discussion of which might have been more challenging. Dr. Knapp has suggested some of them and Dr. Koller and Dr. Hirsch have suggested others. There is evidence on every hand of the need for penetrating, forward-looking research designed to push back the frontiers of cooperative thought—to bridge the gap between economic theory and cooperative practice, to develop an economic concept of a true cooperative, to appraise the economic potentialities of cooperation in our changing economy, and to evaluate the contribution of cooperation to progress and general welfare.

The writer believes that vertical integration is involved to a greater extent than Dr. Knapp seems to imply.

Dr. Knapp places much emphasis on horizontal combination *of cooperatives*. This corresponds to the emphasis in economic literature placed on the process of integration taking place in other industries by a firm gaining control *of other firms*. The writer believes that more emphasis needs to be placed on gaining control of processes, functions, or activities, rather than of firms, because gaining control of firms is the *means to the end* of achieving control of functions or processes. Moreover, in agriculture, integration usually takes place by a process other than that of absorbing firms.

An important point that seems to be overlooked or subordinated is the fact that in agriculture cooperation is an important means by which farmers may not only *coordinate* marketing and other activities which they may already be conducting, but is a method by which they may integrate additional marketing, processing, and other activities *with agricultural production.*

The "diversification" of which Dr. Knapp speaks is regarded by some authorities as a third type of integration, i.e., "lateral" integration. In cooperatives parlance it means adding "sidelines." Dr. Knapp properly points out some of the problems involved in an effort to arrive at the most economical combination of enterprises. The problem is one that is soluble on a theoretical basis, by the use of available analytical tools. However, the solution in the case of a cooperative would need to take account of the fact that it seeks to maximize the net profits of the members' businesses rather than the total net profit, as in the case of a non-cooperative firm.

The writer has found it convenient to classify the reasons why farmers find it advantageous to cooperate under three broad headings:

1. To overcome some of the disadvantages of the typical production unit, which may be of optimum scale for the performance of certain functions but far short of optimum for the performance of many others;
2. To overcome the disadvantages of the typical farm unit in its market contacts; and
3. To improve the functioning of the markets in which the farmer transacts his business.

Economists also will probably discover that there are economies of integration which are independent of the economies of mere scale. An illustration may be the economies which arise as a result of better coordination through integration of the different steps or stages in the marketing process.

The public attitude toward agricultural cooperatives is likely to become an increasingly important factor in their development. More attention is likely to be focused upon the extent to which cooperatives contribute not only to the welfare of farmers, but to the general welfare. Cooperatives in the past have probably contributed less to reducing the disparities between high and low income farmers than has been supposed.

It is generally but erroneously assumed that a cooperative, like an ordinary firm, seeks to maximize its total net profit, rather than the total net profits of the integrating firms (farm businesses in the case of a farmers' cooperative) which are the "multiple parents" of the cooperative as a subsidiary.

Some comment would seem appropriate as to the relative efficacy of integrations being controlled by farmers, consumers, or middlemen.

The question of how far farmers should carry the integration process cannot be answered fully without reference to considerations of optimum scale of operations for each of the integrated operations under different assumed conditions in the market, such as monopoly, perfect competition, or the more generally prevalent condition characterized by excess facilities or duplication of marketing services. Analysis is also needed of how and where equilibria would be established as between cooperative and noncooperative operations and as between members' and cooperative's outputs in a given agricultural commodity market.

Theoretical analyses in each of these "problem areas" need to be supplemented by analyses based on empirical data. Research on so-called "practical" cooperative problems needs to be oriented to accepted economic concepts and appropriate analytical techniques used.

LAND ECONOMICS RESEARCH IN RETROSPECT AND PROSPECT

E. H. WIECKING
Bureau of Agricultural Economics

THE topic assigned to me is a broad one. An appraisal of land economics research has been ably made by others—notably the late Leonard Salter. Such a review and critique I will not attempt. My own limitations in this connection must frankly be recognized, for I returned only recently to research after a decade in the field of resource administration. As a land economist gone wrong and now seeking redemption, I should like, however, to offer some observations in retrospect, but more particularly in prospect, heavily influenced, inevitably, by my recent experience on the outside, so to speak, looking in. Perhaps it is more accurate to say "partly outside and partly inside" for, although not doing research, our administrative group handled many problems dealt with by land economists and we drew on their research findings.

In Retrospect

Land economics research has always, it seems to me, been responsive to current and emerging problems of the times. The early workers in the field were caught up in the backlash of our free-handed public land policy. They were distressed by a homestead policy that did not fit the drier lands of the West. They saw the remaining western public domain wide open, forest and mineral lands misused, promoters luring the unwary into ill-advised colonization schemes. Rising tenancy and mortgage debt alarmed them. The disastrous land boom of World War I and the later rash of soldier and other settlement schemes, some governmentally sponsored, troubled them. They were concerned about the major uses of our land resources for forestry, pasture, and crops; and how, and from where, the food, fibre, and forest product requirements for a growing population were to be met. They were disturbed by local and regional maladjustments in land use; by rural poverty, tax delinquency, farm abandonment.

Their research reflected these problems. But their research, whether always successful or not, was research with a purpose. They insisted that "something be done about it," always in the

interest of *people*, now and in future. Theirs was an area, a group, approach—community, region, nation. They analyzed the present and potential physical and economic base of areas as a whole; the community and its institutional arrangements; the influence of the resource base upon those institutions, and in turn, the influence of those institutional arrangements upon resource use; the internal economic and social influences within the community, and the external economic and social influences playing upon it; the part being played, and that *could* be played, by government, cooperative action, public policy. They were, I suspect, regarded frequently as a rambunctious lot, questioning the laissez-faire doctrines of the time, getting in the hair of lawyers and political scientists, intruding into the precincts of the physical scientists, and disturbing the peace of economic interests. I hope land economists remain—shall I say—judiciously rambunctious.

Came the Great Depression, drouth, reform. The National Land Use Planning Committee and the National Advisory and Legislative Committee on Land Use, results of the National Conference on Land Utilization in 1931, disbanded themselves as no longer needed. The Taylor Grazing Act of 1934 brought the public domain under management. Subsequent improvements were made in the administration of homestead policies. A national program was established for public acquisition and development of submarginal land for recreation, fish and wildlife, Indian rehabilitation, forestry, and grazing. Long sought goals of land economists were being attained.

National forests were greatly expanded and assistance to private forestry was strengthened. The Pittman-Robertson and other legislation brought an enlarged program of fish and wildlife protection. A rural resettlement program was set up; with much of this, however, land economists were not too happy. Rural rehabilitation through supervised credit was launched. Federal irrigation expanded. Over some of its policies, land economists still worried.

The report of the President's Great Plains Committee led to remedial action in that large and important area. The Water Facilities Act was passed, in whose administration land economists and a new breed of water utilization economists participated. The work of the President's Committee on Farm Tenancy brought the farm ownership program of the present Farmers Home Administration. A widely read report, "State Legislation for Better Land

Use," emphasized the important part the states have in achieving better resource use. The Flood Control Act of 1936 made agricultural treatment of watersheds an integral part of the Nation's flood control program, and land economists were called upon for new tasks in connection therewith. A national soil conservation program went into operation. An important new public instrument for better land use, the soil conservation district, was forged. An Office of Land Use Coordination was created in the Department of Agriculture, and an Office of Land Utilization in the Department of the Interior.

Reports on all phases of land and water problems appeared under the aegis of the National Resources Board. State planning boards sprang up. Land-use planning specialists appeared in the states. We heard much of problem areas, land classification, area analysis, directional measures, local government in relation to land use, land and water policies, legislative analysis. Wisconsin's rural zoning and Montana's cooperative grazing association were given wider impetus. A new publication, *The Land Policy Review*, appeared. Land-use planning became a byword and land-use planning committees, standard equipment.

This was a period of land economics research on the grand scale, but the dominant note was planning and action in an atmosphere of economic depression, drouth, and social reform.

Came World War II, prosperity, rains in the Plains, and public surfeit with social reform. The NRPB, state and local planning, the rural resettlement program of FSA, went by the boards. Land economics research was sharply curtailed. Attention shifted to postwar planning and the farm land boom. It was the end of an era. Land economists were discouraged.

But unduly discouraged, I think. A look at the record shows that most of the important legislation and programs are still on the books, curtailed in scope, perhaps, but still in operation. And we came through World War II without either a rash of soldier settlement schemes or a disastrous farm land boom. Incidentally, a surprising number of county land-use planning committees are still functioning.

Land economists learned a lot from the experience. And also, I think, due in no small part to the contributions of land economists over the years, there is now a much broader and deeper citizen interest and concern over resource use in the public interest.

In Prospect

In retrospect at mid-century, the record on things that land economists have been interested in does not look too bad. But let's take a look forward to some of the main currents with which land economists may need to reckon in doing their part to help people solve problems of the future. As I see them, these main currents include:

1. *Future Population Increases*

Our "amazing population upsurge" has radically altered previous population forecasts. I need not point out the impacts this may have upon use of our land and water resources, for *production* of needed food, fiber, and forest products; for *places for people* to live, work, and play.

2. *Regional Development*

Even before the new population outlook became fully apparent, this country had embarked upon a huge program of publicly financed regional development. This is being oriented around our major rivers, and is taking the form of comprehensive development programs embracing all resources. Programs for the Missouri, the Columbia, and now the Arkansas, White, and Red River Basins are "in the works." Beginning steps have been taken for the Colorado. Comprehensive planning for the river basins of New England and New York is under consideration. We may well see similar undertakings launched in other great river basins. I need not point out the implications of all this for land economics.

3. *Water Utilization*

Water, once regarded as a problem only for the West, has become a matter of concern throughout the entire Nation. Conflicts are developing in the East and South between competitive economic uses of water for supplemental irrigation, municipal use, industry, pollution control, flood control, power, wildlife and recreation. Great national programs for water use and development are proceeding rapidly. A recent important addition is the National Water Pollution Control Act of 1948. The Department of Agriculture and the Land Grant Colleges are in the water business, too, in various ways.

I am not sure whether land economists are sufficiently familiar

with the activities of the Federal Inter-Agency River Basin Committee and its affiliated field committees and technical subcommittees. The importance of water has been emphasized by the appointment of the President's Water Resources Policy Commission. Land economists are serving both on the Commission itself and on its staff.

Land and water conservation, development, and use are inseparably related. Land economists, I am certain, should give to water more attention than they have in the past.

4. *Conservation*

Conservation of our land and water resources is a firmly established national policy. The economics of conservation, however, has barely been touched.

5. *Nonagricultural Uses of Rural Lands and Waters*

Recent years have shown rapidly increasing use of rural lands for recreation, rural residences, part-time farms, even industry. The rural-urban fringe is getting to be quite a fringe. Under the influence of the shorter work day and work week, good roads, the automobile, the rural electric line, industrial decentralization and defense dispersal, the trend no doubt will continue strong, bringing more land economics problems for consideration.

6. *Land Ownership*

Problems of farm ownership, tenure, and tenancy do not appear to be burning public issues of the moment. But I would not underestimate the fundamentally deep interest and concern that the American people have on this subject. They are deeply disturbed by what is happening to land ownership in other countries of the world and they realize as never before how basic in the fabric of democratic institutions are widespread land ownership, equitable landlord-tenant arrangements, and Anglo-Saxon notions of private property. Don't misunderstand me. I do not say "it can happen here." But I do say that we must not underestimate the importance of land ownership and tenure here, long range.

7. *Mobilization*

Intruding itself again into all peerings into the future is the shadow of war, partial or total. How partial mobilization will

affect the outlook for the main currents described earlier is difficult to foretell. But further inflation appears to be here and must be reckoned with for the indeterminate future. Farm real estate values, for example, are moving upward again.

Prospective Opportunities for Productive Research

Now, what do considerations such as these suggest for land economics research? I shall undertake to suggest, in general terms only, some lines of research that seem to me to warrant emphasis in the future.

1. *Tenancy and Ownership*

A well-rounded program in this field is going forward with the effective assistance of the Regional Land Tenure Committees Periodic appraisals of the situation must be continued to see where we are drifting. Recent research emphasis on farm ownership is good. The work going forward on legal aspects of tenure, on operating agreements, on father-son transfer arrangements, is in a desirable direction. I suggest the following for increased attention: (1) What will mobilization and inflation do to farm ownership; for example, the reported heavy farm buying by non-farmers as a hedge against inflation? *This* time, will conditions be as favorable as last time for farmers to pay off mortgages from farm earnings? (2) How, under present and prospective high costs for land, buildings, machinery and livestock, can young men without family assistance expect to attain ownership? (3) What adjustments in rental arrangements, possibly not yet fully completed following World War II, are needed under the economic impacts of mobilization? (4) Are current leasing practices equitable and adapted to facilitate mechanization, other technological improvements, desirable shifts in type of farming? (5) Can methods for transfers of ownership, inheritance, for example, be improved, made simpler, less costly? (6) What is the relationship of forest land ownership to forestry practices? (7) In the foreign field, Sherman Johnson suggests that very profitable study could be made of the tenure and ownership systems of the Scandinavian countries.

2. *Farm Real Estate Values*

Farm real estate values have started up again. We rode through World War II without the unfortunate results—so far—that

followed World War I. But will another inflationary rise follow the same pattern? Looking ahead, I suggest: (1) Renewed emphasis on the work on current developments in the farm real estate market. (2) Careful examination of the bases for appraisal. I am not sure that satisfactory appraisal bases have been worked out on the pre-mobilization assumptions. In any case, something new has been added to be carefully reckoned with. (3) Prompt study of alternative ways and means for land boom control—controls may be seriously considered this time. (4) Better current data on rental returns. (5) A thorough study, in both theory and application, of land income and its relation to land values and interest rates.

3. *Land and Water Utilization*

Both the national and local types of land utilization studies over the years have made notable contributions to public thought, policy, and action.

In the admittedly perilous business of looking ahead, it seems to me that renewed emphasis on both the national or over-all, and on local or regional, land utilization studies are called for, but with more attention being paid to water utilization.

On the national basis, we need a continuing comprehensive inventory and appraisal of our land and water resources in what may be called "an appraisal of production needs and potentials." *What* are our potential needs for food, fiber, and forest products, and of what kinds and qualities; *when* do we need them; *where*, geographically, should production be located; *how* do we get the needed production? How much can we count on improved technology? On the results of soil and forest conservation? To what extent can capital, such as increased use of fertilizer, be substituted for land? To what extent must we look to shifts in uses of our land and water resources? At what cost? Where? How fast? Under what policies?

We are embarked, seemingly, on a national policy of public regional development. Prospective development costs will be high in a future of high taxes and rising public debt. Careful cost-benefit analysis from a public standpoint, of alternative means of obtaining increased production will be more necessary than ever, in order that public and associated private investment may be put to the best economic use at the time. For example, can the Nation

get more returns per public and private dollar invested in flood control and drainage in the lower Mississippi Valley than by further investment in irrigation in the Dakotas? Or by drainage and clearing in the Southeast?

Such an inventory and appraisal of resources and requirements is not an easy task but I am convinced of its need. The President's Water Resources Policy Commission is struggling with it. Many data are available; many are inadequate. The knowledge and judgment of various kinds of economists, engineers, foresters, soils scientists and other technicians will be needed in a cooperative effort.

Turning for a moment to the local and regional type of resource utilization study, it seems to me that the more of these we have, the better will be the national inventory and appraisal. More than that, the area analysis approach to the solution of specific regional and local problems seems to me to be the heart of river basin planning. But quite apart from basin programs, there are certain problem areas worthy of study and assistance. Trouble seems to be brewing again in portions of the Southern Plains, for example.

Such national, local, and regional resource analysis, appraisal and adjustment studies, taken together, will have many other essential uses than those mentioned—in guiding private land settlement and development, for example; and in the future, as they have in the past, such studies will have important influences on attitudes, actions, and policies both private and public.

4. *Economics of Conservation*

What part do economic factors play in the achievement of national soil conservation goals? Is attainment impeded by uncertainties as to whether recommended practices will pay the individual? Or are there obstacles such as rental arrangements, landlord-tenant relations, high fixed charges, farms too small, unavailable capital, or unadapted credit? In the light of answers found to such questions, is more or less public participation warranted? These are not academic questions, for both administrators and legislators have noted the differential rates of progress being made, and would like to know why. Research in the economics of conservation can be of great service.

5. Nonagricultural Uses of Rural Lands and Waters

I mentioned earlier the strong continuing trend toward nonagricultural uses of rural lands and waters. City workers are going farther out to live. Industries are locating in villages, and even in the open country. Subdivisions spring up among farms. Local problems of schools, roads, and other public services are thereby accentuated. Just as the abandoned farms in the agriculturally declining "hill towns" of New England are being converted to summer homes, so the use and occupancy of rural land for essentially recreational or residential purposes is proceeding in northern Wisconsin and elsewhere. Sharp rural-urban conflicts appear. Rural zoning may need adaptation to new needs; subdivision regulations invoked; building and sanitation codes considered; increased use of roadside zoning called for. Land economists can render a real service.

As an observation quite aside from the present context, I suggest that land economists keep their rural zoning tool kits up to date. I have a hunch that in the years ahead more use will be made of rural zoning in the open country, and of the land-use regulatory powers of soil conservation districts.

6. *Water*

Obviously land and water must in most instances, at least from the agricultural point of view, be considered together as highly interdependent resources. But the growing attention to water as an economic resource has brought problems warranting more attention by land economists. Among them are the following:

As to *irrigation*: (1) What is the value of water for irrigation and how much can farmers afford to pay for it? This old problem assumes new importance as irrigation development proceeds eastward into the subhumid "transition zone," of reasonably adequate rainfall three years out of five. (2) What can be done to make settlers' progress on new irrigation projects more successful and rapid? (3) How and to what extent does irrigation "stabilize" the adjacent dryland farming and grazing economy?

As to *drainage:* (1) what is the value of drainage and how much can farmers afford to pay for it? (2) What can be done to improve the efficiency of the drainage and the levee district? (3) What can be done to straighten out the multitude of overlapping, uncoordinated, and often conflicting drainage enterprises?

Supplemental irrigation is rapidly increasing in the eastern half of the United States. Continued expansion will make growing demands on available water supplies, both surface and subsurface, and will bring new problems which individual farmers, communities, and public officials heretofore have not had to face. Few states east of the hundredth meridian have adequate policies dealing with rights to use water, suitable administrative machinery for adjudication, or public controls to insure beneficial and economical use of available supplies, including protection against subsurface depletion. Doctrines of "paramount economic use" remain to be developed. Adapted means and principles are largely lacking for planning, development, and administration of group irrigation enterprises. Problems of how much to pay for water and on what basis, and application of benefit-cost principles, are unfamiliar. Early attention to these economic, organizational, and administrative aspects of supplemental irrigation should go far to avoid subsequent difficulties.

And finally, the far-reaching *national programs for multiple-purpose water development* have raised many problems to challenge land economists. I shall single out three that seem to me to be of special importance at this time.

(1) *Inundated Areas.* The flooding of reservoir areas may result in sharp impacts both on people required to move and on others who may remain in adjacent areas. Those forced to move are subjected to costs and losses uncompensated for now. Enterprises located outside of the reservoir area, which do business with people in the reservoir area or are dependent upon resources located therein, may have their incomes reduced. Local units of government may face drastic reorganization of schools, roads, and other public services, and have their tax base reduced or even eliminated, sometimes in the face of outstanding bond issues. It has been estimated that in the Missouri Basin alone 5,000 families, 2,000 school districts, and 2.5 million acres of land are in reservoir areas included in the Pick-Sloan plan. For all river basins contemplated for further development, a tremendous total displacement is indicated.

The fact that benefits from a project as a whole may exceed its costs overlooks three things: (1) important costs and damages from inundation are not included as project costs under prevailing procedure; (2) even if they were, legal authority to pay them is lacking; (3) benefits which those displaced or damaged cannot

themselves tangibly and promptly realize upon, are of scant assistance in meeting the real and immediate costs incurred.

The Federal Inter-Agency River Basin Committee has asked its Benefit-Cost Subcommittee to explore the problem. A pioneer, landmark study was recently published by the Missouri Division of Resources and Development. But only a beginning has been made. Here is a problem of national importance on which land economists can make a real contribution.

(2) *Protected Areas.* Inundation deals with effects above the dam. What happens below the dam? To land use, for example? To the resource base as a whole? To land development and settlement? To the local public service pattern? To farm, business, and local governmental incomes? What economic problems are posed for drainage and levee districts? Experience below some dams in certain of our humid areas, structures that have been in long enough for results to become apparent, suggests a fertile field for cooperative study by land economists and engineers. Such studies could lead to significant improvements in the design, placement, and operation of dams.

(3) *Benefit-Cost Analysis.* I have already mentioned my belief that benefit-cost analysis from a public or social viewpoint is destined to become of increasing importance in resource development projects and programs. Economists, in my opinion, have given too little attention to the principles, methods, and procedures in this field, and to the specific problems of application to project analysis.

The significance attached to this whole complex problem is indicated by the Federal Inter-Agency River Basin Committee's appointment of a Subcommittee on Benefits and Costs. Economists are teamed up with engineers. A report has just been published, entitled "Proposed Practices for Economic Analysis of River Basin Projects." I commend it to your careful study.

Criticisms and suggestions will be welcomed. A committee product, the report is fully recognized as not perfect. But it is the first time that the problem has been tackled in a searching, comprehensive manner. Little help, I may observe in passing, was obtainable from existing economic or engineering literature.

This report is only a beginning effort in a challenging new field for exploration by land economists. There is plenty of room for theoretical exploration; for example, secondary benefits and second-

ary costs. There is plenty of room for more detailed exploration of specific segments; for example, the economics of reservoir sedimentation. And there is a lot of room for translation of principles to the problems of practical application, into the day-by-day procedures for agency operating handbooks.

In retrospect, land economists by their responsiveness to, and their approach toward, current and emerging problems of their times, have significantly influenced thought and action in the solution of these problems. In prospect, equally vital problems lie before them. Some are land economics undertakings. Others cal for the work and wisdom of various specialists in the social, natural and engineering sciences. All challenge land economics leadership

THE LANDLORD-TENANT RELATIONSHIP PROGRAM IN NORTH CAROLINA

BACKGROUND OF PROGRAM

J. C. Powell*

WE ARE going to tell you about the landlord-tenant relationship program which was started several years ago in Edgecombe County, North Carolina. First, to give you a better understanding of why a program of this nature was deemed necessary, it will best for us to tell you something of the farming background of Edgecombe County and of the conditions that exist there today in regard to the tenant situation.

Edgecombe County is located in Northeastern North Carolina in the upper Coastal Plains Area. It is a relatively large county having approximately 130,000 acres in cultivation. The population is a little over 50,000. A significant factor in relation to the farming economy of this county is the fact that over 54 percent of the population consists of Negroes. The larger population centers are Tarboro, the county seat, and Rocky Mount, which lies partly in Nash County and partly in Edgecombe. These towns furnish the chief markets for the cash crops and other farm products raised in the county. It also might be considered significant that approximately 5,000 fewer people live on farms in the county now than in 1940. This decrease in farm population, of course, was caused by population shifts during the war and by the use of more labor saving machinery in recent years.

The landowners, as well as the majority of white farm population, are of English descent, and most of these have a family farming history going back several generations. Much of the old plantation system type of farming with overseers and hired labor is still in evidence on some of the larger farms.

Our principal crops are tobacco, peanuts, cotton, and corn. The first three of these are considered "cash" crops, that is, they are raised strictly for sale. The fourth, corn, is raised chiefly to feed the workstock on the farm and for other types of livestock that might be raised either for home consumption or for sale or both.

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* County Farm Agent, Edgecombe County, North Carolina.

Until the last few years hogs were the only livestock raised on a commercial basis.

Shifts in Crop Production

Over a period of years a marked shift in acreage of cash crops has taken place. For instance, 40 or 50 years ago cotton was the number one crop, with an acreage ranging from 35,000 to 45,000 each year. At this same time only 5,000 acres of tobacco were being grown and about 7,000 acres of peanuts. Today tobacco is by far the most important cash crop. The allotted acreage of tobacco is a little over 16,000 acres, and it brings in about 10 million dollars a year to the farmers in the county, which is more than the value of all of the rest of the crops put together.

Next in importance are peanuts and cotton. Twenty-two thousand acres of peanuts are being grown in the county this year. Revenue from this crop should amount to approximately 2.5 million dollars. The third major cash crop grown by Edgecombe farmers is cotton. Under allotment this year, for the first time in several years, 17,000 acres were apportioned for planting cotton. With normal yields we could expect 1.5 to two million dollars from this crop. This year, because of a heavy boll weevil infestation and unfavorable weather, yields are going to be exceptionally low. The acreage in corn has been the most constant of all. For a long period of years the acreage of this crop has remained close to 40,000 acres. The yield per acre has been increased materially.

Importance of Labor in the Economy

A point that I wish to emphasize is the importance of labor in the agricultural economy. The labor requirements for tobacco, cotton, and peanuts per unit of product are high. So far, tobacco has resisted all the efforts to complete mechanization, though substantial progress has been made in the mechanization of peanuts and cotton. For these reasons, the farmers in the county have retained hand labor and mules. The same hands and mules needed on tobacco can also take care of additional acres of peanuts and cotton.[1]

[1] For additional information on the extent to which the agriculture of this area has been mechanized see *Farm Mechanization*, N. C. Agricultural Experiment Station Bulletin Number 348. H. Brooks James and Frank D. Barlow, Jr. September, 1946.

The Cropper System

This system evolved from the liberation of the slaves at the end of the War between the States. When the slaves were freed, the old methods of farming were completely disrupted; the landowners were left with land, farming equipment, and quarters, but with no labor or money. The former slaves had only their labor to offer. They had no equipment or farming "know-how." It has been told us, on good authority, that one of the Union officers worked out a happy solution to this situation. His suggestion was that the landowner furnish the land, the living quarters, the team and equipment, and the supervision; and that the former slaves furnish the labor and share equally in the proceeds of the crop. This arrangement appealed to both groups. The new tenants, or sharecroppers, were furnished rations which were to be paid back out of their half of the crop. To this day very few changes have been made to this original agreement which so adequately met the situation. As new elements, such as the use of commercial fertilizers, livestock, and mechanization have emerged, there have been some adjustments, but they have not changed the characteristics of the cropper system.

By way of illustration, let us take a typical Edgecombe farm consisting of 125 or 150 acres of cropland. The operation of this farm will require three or four sharecroppers, depending on the crop allotments. A typical sharecropper and his family will grow on shares 3½ acres of tobacco, six acres of cotton, eight acres of peanuts, and 10 acres of corn. Unless this particular sharecropper has a very large family, it will be necessary for him to "swap" work with another cropper family or hire some extra labor during the harvesting season.

With normal yields and present prices the cropper family unit can expect certain returns. A financial statement might look like this:

Total income from the unit		$3,800
Cropper family share (½ total)		1,900
Less advances for ½ cost of fertilizer, insecticides, fuel, seeds, other crop supplies, and extra labor	$500	
Less advances for living costs	500	1,000
Net for cropper family		$ 900

From this $900 must be paid the cost of clothing, medical care, and other items usually considered essential to a reasonable standard of living.

The question then: Is the sharecropper system, which is dominant in the South, good or is it bad? Should it be done away with or can it be improved?

I won't go into all of the pros and cons of this system or try to answer these questions. Since I have worked with this method of farming for a number of years, however, there are a few observations that I would like to make. First, advancing from a wage hand to a sharecropper or share tenant is considered a mark of progress and a definite step up the agricultural ladder. Second, the opportunity for the sharecropper or share tenant exists to accumulate property and improve his position. The cropper with ability can gradually accumulate machinery, equipment, and workstock. Once he has his own team and equipment he can work on a different share system. He can furnish 2/3 of the fertilizer and related expenses and get 2/3 of the crop. From this he may move to cash renting, or what we call "square halves." Under this type of renting, management service is considered equal to the land as a contribution. The owner and tenant go fifty-fifty with equipment and all operating expenses, then share alike in the net proceeds.

Although there are opportunities for the sharecroppers with ability to get ahead, unfortunately entirely too many lack the necessary ambition, initiative, or ability to make appreciable progress. In fact, the greater portion of the croppers in our section require strict supervision for profitable crop production. There is a wide variation in sharecroppers in level of intelligence, education, and desire for improving their conditions. Generally speaking, they can be classed in two groups—those who are able to grasp new ideas and to do a good job of farming without supervision, and those who are unstable, inefficient, and lack knowledge and a desire to improve their conditions. These are the characteristics that have helped to hold farming on an inefficient basis in our section; and the farm operators as a whole have done little to correct them.

Now, what can be done? Inasmuch as this system of farming is with us and, barring a revolution in agriculture, will not be changed materially, we held the opinion that some type of program was needed that would improve existing conditions. Through a landlord-tenant program, for diplomatic reasons called a Farm Home Improvement Program, it was hoped that a desire could be instilled in the tenants that would bear fruit in improved living conditions, enlarged income, and increased productivity of our farm people. It was anticipated that a scheme of this kind would result in the

operators becoming more familiar with the living conditions and the problems of their tenants; and in turn, the tenants taking pride in their work, in their homes, and in their accomplishments. If these conditions, along with the objectives to be outlined by the next speaker, could be brought about, many of the evils and inefficiencies of the sharecropper system would disappear; and, instead of a system that is looked on with disfavor, it could be one of better business methods, efficiency, and increased standards of living for the producers of high labor requirement crops. It seems to us that this is a realistic approach to a very difficult set of problems.

HOW IT WAS STARTED; OBJECTIVES, SITUATIONS, AND DIFFICULTIES ENCOUNTERED

EUGENIA P. VANLANDINGHAM*

IT IS obvious from Mr. Powell's discussion that a program of some type for improving farm life, especially among our tenant group, was badly needed. It has always been, and will always be, impossible to separate the farm business from family living. It is for this reason that the home and the farm were both included in this program.

Back in 1940, just following the worst depression in history, landowners in Edgecombe County began to realize that something was needed to make the tenant a more efficient operator and to make him more secure on the land. Neither the landowners nor the tenants realized just what the situation was, but it was not too difficult for them to understand that a sound and workable program must be profitable for each of the participants.

In 1941 considerable time was spent on the program by the county personnel and farm management specialists, and much valuable information was accumulated as to what adjustments were desirable, what could be done, and what personnel would be needed. It was necessary, however, to discontinue the program during World War II. It was January 1946 when the program was formally begun with a special Assistant County Agent and Assistant Home Agent employed to carry on the program.

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* Home Demonstration Agent in Edgecombe County, North Carolina.

Objectives

The specific objectives of the Farm and Home Improvement Program in Edgecombe County are: (1) to raise the standard of living of farm people, (2) to increase the efficiency of farm production, (3) to promote greater stability, and (4) to increase effective cooperation between operators and croppers.

These objectives are being achieved in two ways: (1) through the development of a farming system for each cropper unit based upon farm management research and upon the use of recommended technical practices and (2) through a Farm Home Program to include repairs to tenant houses, the re-arrangement of space, the installation of modern toilet facilities, refrigerators, laundry equipment, and radios; and the establishment of an effective food production and conservation program at home.

Method of Procedure

There was no previous work upon which such a program could be based. The *how to start* was largely *home-made.* In the creation of this home-made program eight steps were used.

The first step was the compilation of a list of Edgecombe County landowners who had five or more tenant families. These landowners, agricultural workers, and other interested persons, were invited to attend a meeting, at which time the purpose and objectives of the Farm and Home Improvement Program were presented. A list of interested landowners was obtained at this meeting.

The second step was the Assistant Farm and Home Agents' contacting the interested landowners and discussing with them the proposed program. Recommendations for organizing the Landowner-Tenant Program were obtained from the interviews.

The third step was the Agents' winning the interest of the wives of the landlords in the project. The reason for this move was that the wives would play an important role in working with tenant families. It was thought that this interest could best be developed at a joint meeting of landowners and their wives, at which time the details of a tentative program were outlined and fully discussed.

The fourth step was individual contacts by the Agents with each owner and his wife. On these visits necessary adjustments were made in the programs to fit each individual farm needs.

The fifth step was for each landowner to call a meeting of the tenant families on his farm. At this meeting the landowner made

some introductory statements concerning the objectives and benefits of a Farm and Home Improvement Program. The Agents, also, appeared on the program. It was *strongly* emphasized at all of these first meetings that the program was a *joint* undertaking of the landowner and tenant, a program that would benefit both, and that its success or failure was dependent upon the sincere cooperation of the landowner and the tenant. The tenants were asked to express their views regarding such a program.

The sixth step was an inventory of the situation on each tenant unit. This inventory was secured as soon as possible after the farm meetings. The Farm and Home Agents, accompanied by the landowner and his wife, visited each cooperating tenant family. An inventory was made of each family. Individual family needs were not overlooked. Following these visits, the projects to be pushed on each farm were discussed and outlined with the landowner and his wife.

The seventh step was the Agent's monthly visits to the farms to aid in getting the plan under way and to check any progress made.

The eighth step was the preparation of a progress report. A report was completed for each family to determine the weakness and strength of the program and the needs of individual families. As the program has developed, changes have been made wherever necessary.

Achievement Day. An important feature of this program is Achievement Day. On such an occasion all of the tenant families assemble to hear what has and what has not been accomplished during the current year. Such meetings usually take the form of harvest dinners provided jointly by the landlord and the tenants. Prizes for outstanding accomplishments are awarded.

Graduation Day. If a program of this sort is to be most effective, it must provide training for both the landlord and the tenants so that they may accept the responsibility of doing their own planning. To this end a graduation day has been made a part of the program. The time that a farmer is ready to graduate is really hard to define. Graduation time can be determined only by the ability and the willingness of the owner and the tenant to continue the program without outside supervision. In order to help determine when a farmer is ready to graduate, a score card has been devised to rate each farmer. The farmer has to make a score of 70 percent or over on the following items in order to graduate:

1. Cooperation and work
2. Crop production
3. Home food production
4. Home and family improvements
5. Care of farm land and equipment
6. Production and care of livestock
7. Care and protection of farm woods
8. Business methods and ability
9. Citizenship
10. Support of churches, schools, and education

A "ceremony" is held at graduation, at which time certificates of graduation are awarded to the landlord and to each of the tenant families on the farm.

Situations Found

Thirteen landowners with 138 tenant families volunteered to participate in this program. The farms were located in various sections of the county, representing different farm systems, including *resident* and *non-resident* landowners and *centrally* and *decentrally* operated farms.[2] Both white and Negro families were included.

It was found, at the beginning of the program, that the education of the tenant families ranged from none to 11 years. The average education of the 27 white families was 5.6 grades; of the 88 Negro families the average was 3.6 grades. The average education of the white and Negro women was 1.8 grades more than that of the men. The sizes of the families varied from two to 15 persons.

The average family of 6.5 persons had 2.6 bedrooms with 3.8 beds. There were less than one closet per family and only one pantry for every five families. There was an average of 10.1 chairs per family, with many families having less than a chair per person. Two families had no chairs at all. Such conveniences as refrigerators, pressure cookers, and sewing machines were few in number. There was an ice box or refrigerator for every three families, one pressure cooker for every 10 families, and one sewing machine for every two families. Many of these items were in poor condition.

There were two radios for every three families, and one newspaper and one magazine for every five families.

[2] Centrally operated farms are those where all land in the plantation is contiguous. On decentrally operated units, at least part of the land is in separate noncontiguous units.

The average garden was 0.2 acre with seven varieties of vegetables planted. The gardens were mostly spring gardens. There were less than 18 hens per family, one cow for three families, two sows for three families and 2.2 pigs per family. They had conserved only 15 percent of their health needs in fruits and vegetables and 50 percent of their needs in meat and lard.

The houses were graded good, fair, and poor. The average condition of all houses was between fair and poor.

The average family of 6.5 persons lived in a 4.4 room house. This house provided for the bare essential needs for eating and sleeping of the families. Most of the families cooked and ate in the same room, and entertained in their bedrooms.

The major repairs needed for most of the homes were new roofs, ceilings, windows, window panes, leveling, door steps, new floors, weather boarding, additional rooms, and paint. Toilet facilities were very poor and on most farms entirely lacking.

The water supplies of nearly one half of the families were open wells, which were outstanding accident hazards, with decayed curbings. Surface water could pour in and contaminate the water. Only four farms had not been wired for electricity. There were few screens and plenty of flies, mosquitoes, and bedbugs. The conditions for promoting good health were lacking.

Difficulties Encountered in Starting the Program

As might be expected from the situation, many difficulties were encountered in making a Farm and Home Improvement Program "click." Some people felt that nothing could be done to change attitudes or desires of the cooperating parties and that the situation was hopeless.

Some of the major problems encountered with landowners were:

1. Landowners were slow in assuming the responsibility of carrying the program on their own farms. They were perfectly willing to let the Extension Agents do almost everything. They had to be educated to take the lead in the program.

2. Landowners would not visit the tenants' homes. They did not know the actual conditions of the houses. They were utterly amazed at existing conditions on their own property.

The major difficulties encountered with tenants were:

1. The program has been slow because of the educational level

of the mothers and fathers in the tenant families. In most instances, the children had reached a higher educational level than their parents.

2. They possessed certain superstitions, such as the belief that, if they enlarged gardens after they had been planted that some member of the family would surely die.

3. Tenants would not use money to buy things that would do most for family living.

4. Very few tenants put their extra money in saving accounts.

5. Tenants did not feel that they had a responsibility in the homes and buildings.

The whole program has been a challenge from the start, but progress has been made. The old adage, "where there is a will, there is a way," is holding true. The landowners and tenants, with the help of the Extension Specialists and Agents, had the will and the way has followed.

PROCEDURE FOR ONE YEAR OF WORK

ROBERT L. HENDRIX*

I WOULD like to explain the procedure that is followed in a year of work.

This year we have 16 landlords, seven overseers, and 144 tenant families. One fourth, or 36 families, are white; and three fourths, or 108, are Negro.

At the beginning of each year, the landowners to be invited to participate for the coming year are selected. After deciding which owners are to be asked to participate, the Assistant Farm Agent and the Assistant Home Agent contact these owners. For those who wish to participate, an over-all plan is prepared for the farms in cooperation with the landlord, the tenants and the members of their families. In the development of such a plan the system being followed at the time is used as a basis. This system is changed by adjusting the crops, and, when desirable, by adding new enterprises. A comparison is then made between the present and the proposed systems, (1) as to the use of the available labor and other farm resources, and (2) as to the probable economic returns. A study is also made of the practices and techniques used in produc-

* Assistant County Agent in Edgecombe County, North Carolina.

tion. If they are defective or out of date, approved practices and techniques are suggested.

When the plan has been accepted by the landlord, a tenant meeting is called and the objectives and the details of the program are discussed. This meeting is held on the farm in packhouse, landlord's or cropper's house. Slides of activities on other farms participating in the program are shown. Before the end of the meeting, the croppers are asked whether or not they wish to participate in this program. If they agree to participate, the program is then started on that farm.

When a farm is included in the program, the next step is the preparation of a farm plan for each cropper unit. Crop and livestock enterprises, with the practices to be followed in each, are planned at this time. Also included are the food needs of the family. Notes are made on such things as conditions of houses, water supply, health, and vaccinations. Any improvements that should be made are noted; and if the cropper is able to furnish labor, and the landlord, materials, note is made of this fact. This cropper unit plan is of utmost importance, for it serves as a basis for working with each individual family. From this plan the Agents can tell where the weak points are in the program and can work on the weaknesses.

Farm visits throughout the year prove to be very interesting to the Agents and very helpful to the farm families. As the program was originally set up, there was to be one visit each month to each of the farm families. This plan did not prove to be practical because of the number of families involved and special demonstrations being carried on with some farms. Monthly contacts are still made with each family, but often it is in the form of a letter. Three visits a year and two farm meetings are about as many personal contacts as one can have, except with specific families who need extra assistance.

To encourage the adoption of recommended techniques and practices, a series of demonstrations are held each year. For example, demonstrations on tobacco would include: (1) plant bed demonstration, used to illustrate fertilizer practices, weed control, and the curbing of insects and diseases; (2) variety demonstrations, used to show what each variety will do under the same conditions and which are resistant to various diseases; (3) sucker control demonstration, new this year (quite a bit of interest is shown in this due to the amount of work required in suckering tobacco); (4) disease

work, consisting of (a) education—how disease spreads and the methods used to prevent the spread, and (b) control—what can be done after disease is present. In a similar fashion demonstrations with corn and other crops are used to show the effects of techniques and practices.

When a new or unfamiliar enterprise is suggested, the practice is to introduce such a crop gradually. For example, one crop that has been added to the farming system is sweet potatoes. As there are two markets nearby, some of the farmers are trying this crop on a small scale. In such cases demonstrations are especially important.

Forestry is also included in the planning. With the aid of the Forestry Agent, thinning demonstrations and other good forestry practices are brought to the attention of the landlord and the cropper.

In addition to the various crop demonstrations held on the farm, the Assistant Home Agent holds demonstrations in the home. According to the needs, the women are helped with canning, chair covering, sewing, or anything else they request.

EXTENSION METHODS USED TO ACCOMPLISH THE JOB

NANCY W. LEWIS*

MY PART is to present typical scenes of the cooperators in action. I shall do this under three major sub-divisions: (1) Methods used in raising the level of living of tenants, (2) Methods employed in increasing output and in using farm resources, and (3) Methods used in promoting better cooperative relationships between the landlord and the tenant.

Standard of Living

We have used two ways of improving the living conditions of farm tenants. First, we have made the production of essential foods and their preservation a part of the program. This procedure, we think, is basic to balanced diets.

Diets alone, however, do not provide the stimulus necessary for the establishment and the maintenance of a satisfactory standard

* Assistant Home Agent in Edgecombe County, North Carolina.

of living. For this reason attention has been given to making the farm home more attractive. Finally, personal appearance of the tenant and his family has not been overlooked. These are the essential elements: (1) adequate diets, (2) attractive and convenient homes, and (3) neatly dressed individuals.

Let me show you some slides illustrating these elements. First, food production and preservation:

Slide No. 1. A picture of an overseer's purebred hogs in a recommended pasture of crimson clover and Italian rye grass. He won the ton litter contest in both 1947 and 1949.

Slide No. 2. A Negro family in their spring garden which contained all of the vegetables they had been requested to grow. Beyond the garden are 19 hogs, some of which will be sold, since the family does not need them for home consumption.

Slide No. 3. This shows a fine flock of white rock chickens.

Slide No. 4. A convenient and well-built brooder house. The material was furnished by the landowner and the work done by the tenant.

Slide No. 5. A cow which produces 4 gallons of milk per day for a family of 10.

Slide No. 6. An example of an excellent vegetable garden.

Slide No. 7. A pantry filled with canned food for the months when there is a scarcity of vegetables in the garden.

Slide No. 8. A picture of a Negro woman with 20 quarts of canned chicken. This furnished her with an easily and quickly prepared meat during the busy season of tobacco harvesting, and saved her money on the chicken feed bill.

Slide No. 9. This slide pictures a canning record sheet furnished the women by the Agent. It develops a certain amount of pride, gives them a record and helps with the planning of the food budget for the following year.

Now let us turn to the home, both inside and outside. Here we have the problem of making the home not only livable and attractive, but convenient.

Slide No. 10. A picture of the running water in the kitchen of one of the 12 tenant homes which have them. These represent a definite step toward better living.

Slide No. 11. The ideal is reached when the tenants are able to own a kitchen sink in a beautiful metal cabinet as pictured here.

Slide No. 12. This slide illustrates how much more attractive a house is made by painting it on the outside.

Slide No. 13. A picture of 300–400 quarts of canned goods on the floor in a dining room, the only available storage space for it.

Slide No. 14. Attractive cabinets in kitchen of same home which were built to take care of canned goods as well as other unsightly objects which appear in every kitchen where there is not sufficient storage space.

Slide No. 15. The new cabinets furnished by the landowner inspired the tenant to close a worthless door and install a much-needed window which is shown here.

Slide No. 25. This shows another Health Department employee spraying for flies in a stable where it is not convenient to use the pressure sprayer mounted on the truck.

Slide No. 26. The County Nurse is vaccinating one of the Farm and Home Improvement cooperators, each of whom is furnished a schedule of all available services of the Health Department.

Increasing Output

The basis for a good standard of living is income. Not all of the essential elements of a satisfactory level of living can be provided from the farm. Cash is needed to buy some of these elements and it is obtained by selling crops for more than they cost to produce. Hence, efficiency in production is important. I want to show you some of the methods and techniques used in producing crops efficiently.

Slide No. 27. This slide clearly shows the advantage of using Fermate for the control of blue mold, a disease which attacks young tobacco plants.

Slide No. 28. The contrast between black-shank infested tobacco and the resistant variety is forcefully illustrated.

Slide No. 29. For the control of the boll weevil in cotton the spray of liquid toxaphene is used as seen in this picture.

Slide No. 30. Every cooperator on the program is using hybrid corn, another method of increasing the crop production.

Slide No. 31. A picture of an excellent shelter for taking care of the farm machinery, a habit encouraged by the Agents.

Promoting Better Landlord-Tenant Relationships

If this program is to have lasting values, it must provide the conditions under which landlords and tenants can cooperate in farming; it must teach them how to work together, and to recognize and assume their respective functions. In short, the very act of planning and working together tends to develop a desire on the part of the tenants to improve and maintain a high level of living conditions and on the part of the landlords, to take seriously the function of management. That this program is promoting these conditions is illustrated by the following slides:

Slide No. 32. A picture of a landowner and some of her tenants gathered in a building for an organizational meeting, at which time the program was explained to the tenants.

Slide No. 33. This is a copy of the form of the plan used at the beginning

of the year. It is made with the landowner, agents, and tenants present and each is given a copy of it.

Slide No. 34. A picture of one of the annual farm meetings held in the fall of the year. In this instance it was in the dining room of the landowner's home. The subject for discussion in 1949 was "Improving the Home Grounds."

Slide No. 35. A copy of a letter sent to the 20 tenants of one of the landowners who offered five prizes to those of his people who best improved the home grounds during 1950.

These are only samples of the methods used in solving the problems associated with this undertaking. We are confident that if the standard of living of these people can be raised, the production resources used efficiently, and the relationships between the landlords and tenants improved to the point where each recognizes and performs his responsibilities and functions, the cropper system will become a real "rung" in the agricultural ladder.

PROGRESS MADE BY CROPPERS PARTICIPATING IN THE PROGRAM

W. L. TURNER*

AT THE beginning of the Program, February, 1946, on the farms and in the homes of all cooperating croppers an inventory was taken to gain information on the current year concerning tenant families. In January and February of 1949 a similar inventory was taken to determine whether any changes had been made by croppers participating in the Program; some of the changes are shown in Tables I and II.

A study of the Program shows that the standard of living of croppers has been raised, housing and sanitation have been improved, food supply has increased in amount and variety, and numerous home conveniences have been added. As measured in increasing yields of tobacco, cotton, and corn by the adoption of improved practices, the efficiency of farm production has been increased. Peanut yields have decreased but less than the average decrease for the county. Hogs have been added as a commercial enterprise on part of the farms. Conservation practices, such as terracing, ditch-

* Farm Management Specialist, North Carolina State College. The data are from *A Study of the Farm and Home Improvement Program, Edgecomb County, 1946–1949,* a M.S. thesis submitted to North Carolina State College in 1950.

TABLE I. CHANGE IN SOCIAL AND ECONOMIC STATUS OF CROPPER FAMILIES CO-OPERATING IN THE FARM AND HOME PROGRAM IN EDGECOMBE COUNTY, NORTH CAROLINA, FROM FEBRUARY 1946 TO FEBRUARY 1949

Item	1946	1949
1. Average size of garden (acres)	0.4	0.6
2. Canned goods (average quarts per family)	65	129
3. Stored foods:		
Irish and sweet potatoes (bu.)	5.1	32
Meat and lard (lb.)	676	952
4. Housing of tenants		
Condition of house (percent)		
Good	8	31
Fair	65	56
Poor	27	13
Size of house (number of rooms)	4.5	4.8
5. Livestock owned by tenants (total number)		
Cattle	26	28
Hogs	196	436
Hens	1,081	1,746
6. Fruit trees (average number per family)	0.5	6.4
7. Crop yields:		
Tobacco (lb.)	1,211	1,243
Cotton (lb.)	328	558
Peanuts (lb.)	1,267	1,119
Corn (bu.)	23.5	36.2
8. Average value of cropper's share of production	$2,074	$2,404
9. Average standard of living index*	3.3	4.0
10. Mobility rate of tenants (percent)	43	12
11. Average acreage of cropland per family	23.2	23

* The index used was developed by Dr. C. Horace Hamilton, Head of Department of Rural Sociology, North Carolina State College.

ing, and seeding winter cover crops, have been adopted. The mobility rate has decreased from 43 percent to 12 percent. All of these changes have been brought about during a period of adjustment to postwar production levels and prices.

The Program also has been of advantage to landlords. Benefits measurable in dollars include (a) increased value of property, (b) higher incomes, and (c) lower depreciation and repair bills on buildings and equipment. Landlords have profited from greater stability of tenants and from better conservation. Several landlords, however, indicate that their most valuable benefit has been the

TABLE II. TOTAL NUMBER OF PERSONAL ITEMS AND CONVENIENCES OWNED BY CROPPER FAMILIES PARTICIPATING IN THE PROGRAM IN EDGECOMBE COUNTY, NORTH CAROLINA, 1946 AND 1949

Item	1946	1949	Percentage change
Stoves:			
Wood	62	43	−31
Oil	9	20	122
Electric	0	2	—
Gas (bottled)	0	5	—
Heaters (room)	69	120	74
Refrigerators:			
Ice	25	19	−24
Electric	0	21	—
Water Supply:			
Well	36	23	−36
Pump	35	37	6
Running water	0	10	—
Pressure cookers	4	19	375
Canners	0	15	—
Beds	235	263	12
Mattresses	232	257	11
Springs	234	254	9
Bureaus and dressers	173	213	23
Chairs	596	886	48
Sofas	34	53	59
Tables	34	61	79
Radios	48	88	52
Irons:			
Flat	40	33	−18
Electric	18	57	217
Washing machines	2	13	650
Pianos	0	2	—
Newspaper subscriptions	19	38	100
Magazine subscriptions	19	65	242
Telephones	0	2	—
Sewing machines	33	39	18

satisfaction derived from assisting the croppers to increase their standard of living and to become better citizens.

Perhaps of greatest importance is the change in attitudes of the landlords and croppers. Cooperation between landlords and croppers has increased. There is a greater respect for the landlord's property on the part of the cropper, and a greater appreciation of the needs of the cropper on the part of the landlord.

Perhaps the best proof of the success of the Program has been

the participation of the same landlords and croppers over a period of years. All landlords and croppers are still cooperating with the Program—all except those on one farm, which was graduated from the Program.[3]

Several defects of the cropper agreement have been at least partially eliminated. The agreement has been made more definite and flexible enough to permit the addition of new enterprises and practices. Length of term has not been increased but automatic renewal has been included in the agreements. The agreements are more complete. Crop practices, management responsibilities, and woodland management practices are specified. Agreement is reached on miscellaneous contributions of landlords and croppers. Undoubtedly these improvements have been partially responsible for the achievements accomplished.

APPRAISAL OF THE PROGRAM

C. B. RATCHFORD[4]

SEVERAL methods could be followed in appraising the program. The approach we shall follow is to determine whether the program has promoted the much needed changes in the agriculture and standard of living of the people of the area. This approach is particularly applicable because of the belief held by some that the cropper economy cannot be modified and improved, but that the whole system must be destroyed before the agriculture of the area can progress.[5] Those holding this belief would say that the program was merely maintaining the *status quo;* and they probably reach a conclusion that the program really harms the area in the long run, in that change is prevented or slowed down.

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[3] A farm is graduated from the program when the operator and croppers feel that they can conduct the program without the assistance of the Extension Service.

[4] Extension Economist, Farm Management and Marketing, North Carolina State College.

[5] This belief is usually not stated so bluntly and is seldom written. Such a statement is frequently voiced, however, by agricultural workers, by social workers, and even by farmers. The same view might be held by those who advocate a family-farm economy and the abolition of all tenancy. For a list of authors and articles holding such views, see *Farm Tenancy in the United States, 1937–1939,* Agricultural Economics Bibliography No. 85, BAE, 1940 and *Farm Tenancy in the United States, 1918–1936,* Agricultural Economics Bibliography No. 70, Bureau of Agricultural Economics, 1937.

Before appraising the program it will be necessary to list the major problems of the area.

Major Problems of the Area with Application to the Cropper Economy

The problems of the area have been listed by several authors.[6] Although different methods of classifying the problems are used, there is essential agreement that those listed below are the major ones.

1. The farms are small. In North Carolina in 1945 the average acreage was 64.8, and in Edgecombe County the average acreage was 72.3. These data give an erroneous picture of the actual size as a considerable portion of the land cannot be devoted to crops. The average acreage of open land was 30.3 and 36.2 in 1945 in North Carolina and Edgecombe County respectively.[7] The typical cropper unit in the Coastal Plains Area of North Carolina used about 20 acres of land in 1949.[8] It should be kept in mind that the size of cropper units can easily be increased. For example, it could be doubled by removing half of the croppers.
2. The capital per worker is low. In 1945 the average operating capital per farm worker in North Carolina was only $558.[9] A current study by the North Carolina Agricultural Experiment Station indicates that the average operating capital on cropper units is below the average for the State.[10]
3. The farm resources are only partially employed. This is particularly true of labor. The labor required for the crops and livestock produced in North Carolina in 1945 amounted to more than 70.5 million man days. The amount available during the same year, one in which

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[6] The Special Committee of the American Farm Economics Association, "Adjustments in Southern Agriculture with Special Reference to Cotton," This *Journal*, Vol. XXVIII, Number 1, 1946, pp. 341–379; Charles T. Taylor, "Some Economic Consequences of Federal Aid and Subsidies to Southern Agriculture," *The Southern Economic Journal*, Vol. XIV, Number 1, 1947, p. 65; G. W. Forster, "Southern Agricultural Economy in the Postwar Era," *The Southern Economic Journal*, Vol. XIII, Number 1, 1946, pp. 65–71; Committee of Governor of North Carolina, *A Farm Program for North Carolina*, Extension Circular, North Carolina Agricultural Extension Service, Raleigh, North Carolina, 1948. Also see *Study of Agricultural and Economic Problems of the Cotton Belt*, Hearings before the special Subcommittee on cotton, House of Representatives, 80th Congress, 1st Session, July 7 and 8, 1947, and *Cotton*, Hearings before the Special Subcommittee on Cotton, House of Representatives, 78th Congress, 2nd Session, December 4–9, 1944.

[7] The data are from the *Agricultural Census for 1945*.

[8] This figure is from a study by C. B. Ratchford now in progress at the North Carolina Agricultural Experiment Station.

[9] *A Farm Program for North Carolina*, *op. cit.*, p. 12.

[10] (See footnote 8) The analysis is not far enough along to give a final figure. On typical cropper units the total operating capital was $492. There is more than one worker on each unit, but the exact number is not available.

farmers complained about the labor shortage, was 113.2 million man days, which shows a surplus of 60 per cent.[11] True, most of the surplus arises from the production of crops with high seasonal labor requirements. Nevertheless, much of the available labor is unused. Even considerable land is unused, not to mention that which is under-used. The typical cropper unit produces one or more of the three cash crops—cotton, tobacco, and peanuts—and corn, all of which require somewhat similar soils. The heavier soils, which are excellent for the production of grass and hay, are not used in many cases. Also there is considerable idle land. The census shows that 906,073 acres, or 10.4 percent of the open land, were idle in 1945.

4. The agriculture is not mechanized. Most farm work is still done with a man, mule, and a plow. It must be pointed out, however, that it is impossible at present to mechanize completely tobacco production; and as long as the peak labor period which occurs during the harvest of tobacco cannot be reduced, it is doubtful whether it is profitable to mechanize the operations on any crops.[12]
5. The croppers and their families are poorly trained. The average grade of school completed by the croppers participating in this program, and they are certainly not below average for the State, is 3.3.[13] The croppers have not participated in the regular Agricultural Extension or Vocational Agricultural Programs. The lack of formal training plus the background of the croppers indicate the reason for the low level of training.
6. The agriculture of the area is built around the production of tobacco with cotton and peanuts playing minor roles. As previously indicated, this type of agriculture leads to inefficient use of all land and labor and to the use of inefficient production methods. Actually all of the above problems are associated with, and could be grouped under, one problem—inefficiency. The result of the inefficient agriculture is a low income. The per capita income in North Carolina in 1946 was $550.[14]
7. The agriculture of the area is unstable in several respects. Income is unstable due to the violent fluctuations in the prices and purchasing power of cotton and tobacco. Since the production of cotton, tobacco, and peanuts is affected sharply by weather conditions, weather is an important source of instability in income. The people are unstable. The percent of turnover of croppers cooperating in this program was 43 in 1946.[15] In 1949 the turnover in the Coastal Plains

[11] *A Farm Program for North Carolina, op. cit.*, p. 13.

[12] See H. B. James, *The Effects of the Mechanization of Agriculture in the Northern Tidewater Area of North Carolina*, a dissertation submitted to Duke University in 1949, pp. 203–204, and G. W. Forster, "Impact of Technology on Southern Agriculture," this *Journal*, Vol. XXIX, Number 2, 1947, pp. 524–525.

[13] H. C. Scott and Athlea Boone, Progress Report on the *Farm and Home Improvement Program*, a mimeographed report of the North Carolina Agricultural Extension Service, 1947.

[14] *A Farm Program for North Carolina, op. cit.*, p. 9.

[15] See Scott and Boone, *op. cit.*

Area of North Carolina was 46.5 percent.[16] Another element of instability in the long run is soil erosion and depletion.

8. The standard of living is low. This is partially a result of the inefficient and unstable agriculture. It is also associated with the values, attitudes, habits, and customs of the farm people.[17]
9. The majority of the croppers operate under the "furnish system."[18] In 1949, living expenses were financed by the landlord for 78.4 percent of the croppers surveyed in the Coastal Plains Area of North Carolina. Farm operating expenses were financed for 88.7 percent of the croppers. This system ties up for consumption capital needed by the landlord and croppers for production. The cost of this credit to the cropper is high.[19] Perhaps the most important effect of the system, however, is that irresponsible, unthrifty, and unbusinesslike attitudes are developed in the croppers. As a result of the high cost of credit and the attitudes just mentioned, croppers either are unable to and/or due to a lack of incentive or initiative, do not accumulate even a substantial amount of personal property, much less operating capital.
10. The cropper agreement has many features which prevent an efficient agriculture and bar adjustment of farming systems. The agreements are oral, last for one year, are indefinite and incomplete, and lack compensation clauses.[20] Almost every defect of leases listed by Earl Heady in his article in the 1947 issue of this *Journal* is present in the cropper agreement.[21]

Appraisal of the Program

Has the program in Edgecombe County helped solve all or part of these problems?

An effort was made to increase the size of cropper units by increasing the acreage and by making a more intensive use of present acres. Landlords were advised to weed out "poor" tenants and to give the "better" ones an opportunity to increase their incomes. It is important to note that the philosophy of keeping the people

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[16] From a study on tenancy being conducted by C. B. Ratchford at present at the North Carolina Agricultural Experiment Station.

[17] For a good discussion of the social aspects of the problem see Rupert B. Vance, "Human Factors in the South's Agricultural Readjustment" *Law and Contemporary Problems*, Vol. 1, Number 3, 1934, pp. 259 *et seq.*

[18] "Furnish" refers to the arrangement whereby landlords finance the living and production expenses of croppers. Another variation is for a time merchant to finance the cropper with the landlord guaranteeing the loan.

[19] The usual charge for such credit is 10 percent of the amount advanced. This results in an annual interest rate of 25 to 35 percent.

[20] Data on cropper leases will be presented soon in a dissertation by C. B. Ratchford, "Rental Arrangements in a Developing Economy," Duke University.

[21] *Economics of Farm Leasing Systems*, Volume XXIX, Number 3, 1947, pp. 659-676.

on the land, which is popular in many quarters, was not followed. However, the average acres operated by croppers were not increased.[22] The peculiar labor requirements of the cash crops and the desire of the landlords to have plenty of labor available on the farms are largely responsible for the lack of increase in size of cropper units. The size of the operation was increased on some farms by making fuller use of the land available through a more intensive application of variable productive factors on cash crops, and through the addition of new enterprises which more effectively utilize land not suited for cash crops. The educational work of the county agents and landlords and the changing of the cropper agreements are largely responsible for the more intense utilization of land.[23] A fuller use was also made of the labor resources.

The amount of capital was increased slightly. Buildings were remodeled and some new ones constructed. Oil burners were installed in tobacco barns. It was not possible to mechanize the farming operations to an appreciable extent, but additional equipment was added in some cases. A plan was worked out with one landlord to mechanize to the fullest extent possible. This experiment did not prove satisfactory to landlords or croppers, and the county agents recommended changing back to the use of workstock.[24]

The level of skill and training of croppers was definitely improved by the program through efforts of the county agents. The croppers learned of new varieties of crops, how to produce a good garden and livestock for home use, how to control insects, how to make

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[22] The average acreage per unit was 23.3 acres in 1946 and 23.0 acres in 1949.

[23] The educational efforts of the county agents and landlords include meetings, demonstrations, letters, and personal contacts. The inclusion in the cropper agreement of production practices, conservation practices, and improvements to be made undoubtedly helped utilize the land more effectively. The fact that a definite agreement was prepared and the security of the tenant and landlord was increased also helped. The plans discussed by Mr. Hendricks and Miss Lewis are the agreements between the landlords and croppers. While this plan may fall far short of a desirable lease, it is a vast improvement over the typical agreement which is usually limited to a discussion of the acreage of cash crops and the extent to which the landlord will furnish the cropper.

[24] The fact that tobacco, cotton, and peanuts do not lend themselves to mechanical production is an important reason why the experiment failed. Also tractors were operated inefficiently due to the low level of skill and training of the croppers. The croppers did not like the arrangement because the agreement called for them to pay part of the operating costs. They said that workstock was furnished at no cost and the tractor should also be furnished. Also croppers simply did not understand the agreement and, since it was different from the usual arrangement, mistrusted the intentions of the landlord. An analysis of the farm records revealed that the cropper actually had a terrific advantage under the agreement.

the home comfortable and attractive, and many other things. Not only did the croppers learn of the new methods and practices, but they learned to apply them.

Crop yields have been increased. Tobacco yields have enlarged slightly and corn and cotton yields substantially. While peanut yields decreased, the reduction was less than for the county as a whole.

The four preceding paragraphs list several of the many factors indicating that the efficiency of the agriculture has been increased. The results of the increase in efficiency are found in enlarged incomes. The average value of the cropper's share of production increased from $2,074 in 1945 to $2404 in 1948. The increase was made in spite of a 28 percent cut in tobacco allotments in 1948, the crop responsible for over 50 percent of the income. Of course, prices were higher in 1948 than in 1945. The increase in prices, however, was only 13.5 percent for tobacco, 32.8 percent for cotton, 17.4 percent for peanuts, and a decrease of 8.8 percent for corn.

The stability of the agriculture and of the people has been improved. A certain amount of the instability due to weather has been removed by diversification and by the use of recommended practices. Soil conservation has been increased on the farms through the use of cover crops, improved rotations, and the addition of mechanical measures, such as terracing and ditching.

Some croppers have been persuaded to dispense with the "furnish" system. Little success has been achieved, however, in getting croppers to manage their income so that it is unnecessary to depend upon the landlord for funds to finance living expenses during a large part of the year.

The cropper agreement has been modified in some cases to permit the production of livestock. The agreement, which is a more complete and definite statement of the rights and obligations of each party, encourages the use of efficient farming methods and the improvement of the farm. The relationship of landlords and croppers has been improved.

Finally, the increased efficiency and stability of the agriculture plus the improved relationships and level of training have resulted in a higher standard of living for croppers and higher incomes and more valuable property for landlords. Improvements in citizenship, a greater sense of responsibility, pride in accomplishment, and many other items are an intangible part of the benefits.

DISCUSSION

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It is important that we keep in mind the purpose of this type of educational effort, which is to shorten the time lag between the availability of research results and new technologies, and their practical application. It is not enough to disseminate widely the newly discovered knowledge but to give sufficient assistance to those concerned to apply it. This should be done so long as the benefits to society exceed the cost.

The job these county extension workers are trying to do is a tough one. Not only must they know the latest recommended practices but they also have the job of working out a human relationship climate that will permit the project to go forward. It is important that we keep in mind that it is an experiment. The agents and specialists are to be complimented on the attention being given to progress and possible ways for improving the work.

It seems to me that this undertaking:

(1) Creates an interest on the part of both owner and cropper to want to do better not only for the farm but by each other.

(2) Provides an atmosphere where better management, including the application of better practices, can be adopted. This actually increases production and income which in turn increase the amount available for sharing.

(3) Promotes mutual trust and understanding between the owner and croppers.

(4) Increases the length of cropper tenure. To reduce the mobility from 43 percent to 12 percent per year is a significant accomplishment.

What are some of the problems in the future of this work? They are as I see them:

(1) Securing the professional manpower requirements necessary greatly to expand the program. I see no sure road to success through extensive, or what we usually think of as regular, educational work. To make progress the work must be intensive. With more experience I believe procedures can be worked out to reduce the professional assistance needed.

(2) Can the budget available for professional workers provide the manpower? There is sufficient evidence to indicate that the North Carolina legislature and those of many other states are willing to go much further than many have gone so far.

Regarding the application of this approach to the usual landlord-tenant operation found in the Midwest, I have only a few observations to make:

(1) Our commercial farm managers are doing essentially the same job on a fee basis.

(2) The problem farms in the Midwest are those that just do not produce enough to permit a satisfactory sharing.

(3) To be successful it seems to me that a program must create on the part of the owner and operator a desire to want a better organized and operated unit. After this is accomplished, inequities in sharing arrangements can more easily be worked out.

THE APPLICATION OF STATIC ECONOMIC THEORY TO FARM MANAGEMENT PROBLEMS

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THE farm management program of these meetings was developed as an integrated unit to stress types of problems occurring in the field, to discuss the application to these problems of common analytical tools available in economic theory, and to emphasize the usefulness and needed development in newer methods of analysis. This morning we will be concerned with the second phase of the unit—the application of static economic theory to farm management problems.

An introductory statement is necessary to give specific meaning to some words and concepts. For the next 20 minutes, then, the following interpretations will be given. I hope they meet with general approval.

First, why are we interested in theories and models as analytical tools? Theories and models are of little use in themselves. Perhaps a historian might be interested in the generation and development of an idea, but the farm management technician will require that they serve a more basic need. Theories and models are simplifying devices. They limit and make explicit the implicit presuppositions on phenomena. Reality is often too complex to give answers to the questioning of scientific inquiry. Both devices help to conceive of problems and problem solutions under specified and simplified conditions. It is then possible to transfer this logic to actual problems in the field. This concept might well be a summary on the application of economic theory to farm management problems. Theories and models do not solve problems. They are guides that help us to formalize specific problems, to adopt the appropriate models to obtain a theoretical solution, to develop hypotheses related to the problem, and to adopt appropriate empirical analyses to test the hypotheses.

Second, what theories and models can we use in farm management? The theory associated with the firm under pure or perfect competition is most appropriate for application to many of the problems in farm management. A lengthy statement of assumptions

in this economic sector is unnecessary. The firm is conceived as a maximizing unit using scarce resources in a rational way and selling an undifferentiated product on a market in which the influence of a single firm is negligible. These conditions often correlate well with the general situation in farming. Simple and complex models can be derived under this theory. Their application to the problem of resource utilization can be profitable to problem solution in our field.

In our models, we are concerned with the maximization of monetary returns within general welfare considerations. Although the individual operator may not have this end, models can supply knowledge on alternative opportunities. A more enlightened choice is then possible between the various output combinations in order to achieve maximum returns within the value system of each operator.

Third, what is static economic theory? Static economic theory assumes that relevant characteristics of the problem remain unchanged. Development of the equilibrium solution takes as fixed the tastes, resource, and technology. Static conditions postulate that outputs emerging from a segment of time in the production process depend solely upon inputs in that segment and are independent of inputs and outputs in all other segments.

With these restrictions in mind, we may be on our way.

Diminishing and Increasing Costs

Physical production functions provided by other segments of agricultural science are one of the basic needs of economic analysis. Given the necessary technical input-output information and price relationships, the solution to resource utilization is determinate under our assumptions. Imperfections in both areas leave work for the agricultural economist. But in the technological information, however incomplete, there is one concept so fundamental that it is the foundation for much of our economic theory. This is the Law of Increasing and Decreasing Returns or, using more recent terminology, the Law of Variable Proportions. Interpretation of this law permits the construction of total, average, or marginal output curves for one variable input in combination with fixed inputs. With the application of suitable prices and cost rates, the physical response data can be converted to cost curves. Total, average, or

marginal cost curves can be constructed and while the shape of the curves can vary, depending upon technical and price relationships, each curve bears a precise relationship to the others. When all inputs are considered under two headings of fixed and variable costs in the short run, average total unit costs will decline rapidly at first as output increases because fixed costs are being spread over more units; then, after reaching a low point, average unit cost will increase as a result of diminishing physical returns. Marginal unit cost will equal average total unit costs at its lowest point. Maximum efficiency in the utilization of resources by the firm is achieved at this low point on the U-shaped curve of the average total costs. Maximum economic returns will also be realized at this point in an equilibrium situation when marginal costs, average total costs, marginal revenue, and price are all equal.

The importance of this model should not be judged by the brevity of the presentation. It is so fundamental that it is familiar to all agricultural economists. Therefore, lengthy discussion is unnecessary. But, what about its application to farm management problems? Because of the limitation that all but one factor be fixed, the application to farm management problems is fairly limited. There may be instances when one is interested in the consequences of change in one input factor. With the production function at hand, it is a simple matter to determine the effect on resource utilization, level of output, income, and profit from variation in the use of this factor. Problems on the use of feed concentrates, fertilizer, labor and similar inputs might be attacked in this way. For example, having once established the physical relationship between inputs of feed concentrate and outputs of milk, it would be relatively simple to find the most economical feeding level. Remembering that marginal revenue is equal to marginal milk production multiplied by the price of the product, the most economical feeding level will be where the marginal cost of feed concentrates is just equal to the marginal revenue. Similar approaches could be made with other input factors. However, one would be ignoring the possible interaction and substitution of production factors.

If sufficient technical data were available, all production cost could be broken into two summary categories—fixed and variable costs. One could then develop for a firm portions of the average

total unit cost curve lying both to the left and to the right of the least cost combination. This would be a powerful tool in exploring resource utilization. It would show the most efficient combination of variable resources with fixed resources under specified technological relationships and factor prices. Shifts in the physical production functions or in the price relationship could readily be evaluated in terms of resource utilization, output, and returns.

Limitations would be imposed through the assumption of indivisibility and adaptability of fixed resources, but any deviations from this arrangement in order to minimize risk and uncertainty would approach dynamic considerations. These will be discussed later in the farm management program.

In discussing the adaptation of this model to problems in our field, we are anticipating later discussion. We will leave it for the present to turn to theories that present extremely useful concepts and serve as a transitory device to later discussion.

Combination of Inputs

Criticism was leveled at the primary model because only one element was changed and all others were held constant. A more realistic arrangement would permit the development of output as a result of many variable inputs. As all inputs are substitutable in varying degrees, development of such theories would place us in the heart of problems in resource use by the firm.

Our next model will be developed using two variable input factors. Thereby, output and inputs can still be expressed in graphic relationship, but the concepts can be transferred to the interaction of numerous inputs. Once again, we will pass quickly over the construction of the model in order to discuss its applications.

One of the first concepts to be explored is the substitutability between the input factors. As the inputs are imperfect substitutes for one another and as diminishing returns will occur in the continued use of an input, there are many combinations of the two inputs that will result in the same output. Product contours can be developed, therefore, that will show all the possible combinations that will result in several given output levels (Figure 1). The family of contours would resemble the contour lines on the southwest quadrant of a topographic map of a dome-shaped hill. Output would be indicated by the vertical height from the base. The physical

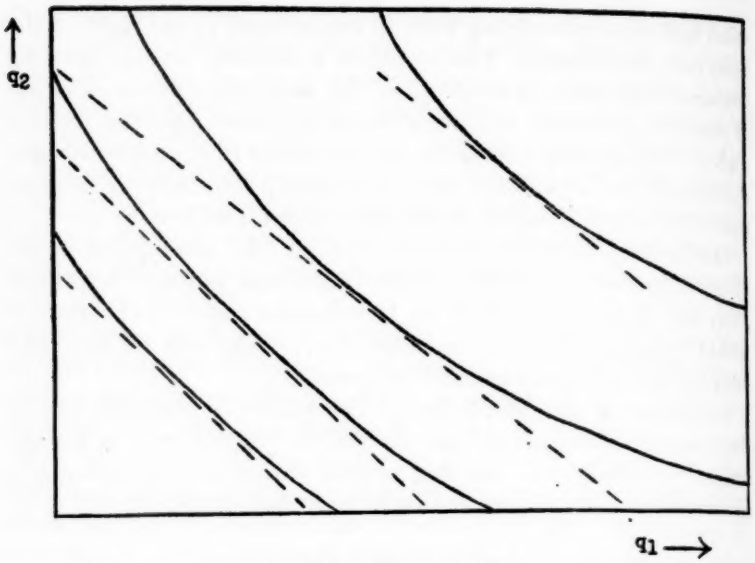

FIG. 1.—HYPOTHETICAL COMBINATION OF FACTORS THAT RESULT IN OPTIMUM PROPORTIONS.
——— Product contour. - - - - Outlay contour.

rate of substitution between the two variables would be shown by the shape of the contour line. Each family of product contours for specified conditions would be furnished by research in the appropriate physical field. Our economic problem would be to discover the optimum combination of inputs with given price relationships.

With given prices for the inputs, outlay contours could be constructed which would indicate the various combinations of input that could be purchased for a given quantity of money. These contours could also be added to our "map." Tangency between a product contour and an outlay contour would show the optimum combination of the two variables for the specific output. At this point, the marginal rate of substitution between the two variables would just equal the inverse ratio of their prices.

A curve drawn from the origin through each tangency point of the outlay and product contour would indicate the "best" combination of resources for various levels of output under the specified conditions. This line is often called the scale line.

It is fair to ask, "do we now have a more useful tool with which to appraise farm management problems?" Definitely so. Readings can be taken from the map to determine costs and returns as in our first model, but now the output is based on the combination of two elements recognizing a cost-minimizing-returns-maximizing technique.

We are now able to attack problems in which two factors can be substituted for one another and to choose the optimum combination with reference to price ratios and production response. Our empirical research can now proceed in a more orderly way to provide the necessary data for an approximate solution of real problems. This problem organization is very helpful. Often, both the farm management worker and the farmer lose sight of the main objective of an adjustment. In Connecticut, recently, considerable emphasis has been placed upon the development of roughage—especially full season pasture. The adjustment has been discussed with farmers as a possible means of reducing concentrates costs. The need for improved pastures is so acute than any selling technique may be justified if it achieves some improvement. With such emphasis, however, the goal of income maximization may be shifted to one of feeding large quantities of roughage. The over-all problem can be brought into focus with reference to our model on factor substitution.

Approximations of the physical response of dairy cows to combinations of pasture and concentrates need to be developed. As farm management workers, we can make a contribution to problems in our field by working with the physical scientists to obtain such data along with the development of appropriate cost estimates of the factors. With these data available, one is in a better position to discuss the optimum combination of roughage and concentrates to maximize income. Extensive development of production functions for many different conditions or adaptation of functions can make the approach useful to individual farmers faced with the management problem. In some instances, development of pasturage may be accompanied by a reduction in feed concentrates with favorable results on income. On many of our Connecticut farms, extensive roughage improvement can occur before the unit reaches the optimum combination of roughages and concentrates under the assumption of income maximization. The relation of each farm to

the optimum situation will depend upon the characteristics of the product contour line, the present location on the contour, and the cost characteristics of the two factors to the farm.

Another problem in the area of roughage production may be appraised by use of the substitution model. Major changes in types of forage and in harvesting techniques have occurred in recent years. These corollary developments have raised many problems for the farm operator. Some farm management research has been done to assist on these problems. Much has taken the approach that what is good for one farmer is good for another. In an appraisal of harvesting methods and equipment, assistance can come from concepts of the substitutability of labor and capital. Capital is used as a summary category for types of harvesting equipment which may range all the way from hand tools to forage choppers and vacuum unloaders. Various combinations of labor and equipment can be combined to harvest a specified quantity of hay. Optimum combinations for given conditions can then be obtained by equating the marginal rate of substitution to the inverse ratio of the factor prices.

Of course, this problem is complicated by such exigencies as the variable influence of different systems upon quality of the product, the differential adaptability to weather problems, the variation in amount and kind of human energy requirement, and the like. Some of these are well within the scope of economic solution. Others can only be considered by presenting the predicted results of alternative actions to the farmer.

If a change occurs in the cost of the two factors, the scale line, which shows the optimum combination for various levels of output, will rotate toward the factor which has become less expensive. The resultant motion is the combined influence of a substitution effect and a scale effect. This concept would be especially helpful in considering adjustments of the farm business to technological changes.

Economies of Scale

While many problems in farm management may be appraised with reference to the model of two factor substitution, other problems require a more complicated design. A solution to the limitation is possible by adapting and extending the concepts of the model.

All that remains is to abandon geometric relationships and turn to mathematical symbols. We are now free to develop the optimum combination of many substitutable input variables and to express accurately all the relationships of our previous models. The keys to the system lie in two facts: that when curves cross or are tangent to one another certain equalities are established, and that by using certain limits the equations can give a solution.

The production process need no longer be considered as the combination of one variable with other fixed resources giving the physical production function

$$Q = f(q).$$

Output can now be expressed as the complex function of a great many variables expressed as

$$Q = f(q_1, q_2, \cdots, q_n).$$

Where, before, maximum economic efficiency in the use of resources could be attained by determining the point at which marginal cost was equal to marginal revenue, the determination of this point is now much more difficult due to the complicated interrelationships of the input factors, and varying prices—$p_1, p_2, \cdots, p_n$. The most economical combination of the production factors will be a function of the physical rate of substitution and of factor prices; the most economical production will be achieved when the marginal rates of substitution are equal to the ratios of factor prices.

Expressed in equation form, this equilibrium condition may be represented as:

$$dq_1/dq_2 = p_2/p_1 = \frac{\delta Q/\delta q_2}{\delta Q/\delta q_1}$$

$$p_3/p_1 = \frac{\delta Q/\delta q_3}{\delta Q/\delta q_1}$$

$$p_n/p_1 = \frac{\delta Q/\delta q_n}{\delta Q/\delta q_1}$$

"... the first term represents the marginal rate of substitution between the first two factors; the second term is, of course, the (inverse) ratio of prices; while the last is a ratio of partial derivatives

where the numerator represents the marginal productivity of the first—this ratio also equals the marginal rate of substitution."[1]

Solution of equations established to equate the marginal rate of substitution and factor price ratios provide data from which cost curves can be developed for given production functions and price relationships. To determine output and profit, no new data are required. Profit can be represented by total revenue less costs of the several input factors.

$$P = Q_p - q_1p_1 - q_2p_2 - \cdots q_np_n.$$

Profit maximization can be solved by equating marginal income and marginal expenditure for each input factor.

Taking partial derivatives of the above equation with respect to each of the input elements and equating them to zero gives us the following set of equations that must hold in our equilibrium position:

$$\delta(Qp)/\delta q_1 = p_1$$
$$\delta(Qp)/\delta q_2 = p_2$$
$$\delta(Qp)/\delta q_n = p_n$$

We are now quite close to our original model. You will recall that we indicated it would be a powerful tool if we were able to develop portions of the cost curve for an individual firm. But this is what we have just done with given production functions, rates of substitutions, and factor prices. So now we have a tool to help us with respect to problems in resource utilization and profit considerations. Changes in production technology or prices and costs can be appraised with reference to farming adjustments. The farm management worker will then be better able to assist each operator on his adjustment problems.

Are we in farm management able to utilize this analytical tool? As a group I don't believe we can fully exploit this method at present, but I also believe we are moving rapidly toward the facility. Several factors lead to these beliefs. One might be called mechanics. Physical production functions in appropriate form are not readily available from physical sciences. This lack is recognized

[1] R. G. Bressler, "Economics for the Natural Scientist," University of Connecticut, December, 1948. (mimeo.)

by workers in these fields. Teaming up with these workers to integrate physical and economic research can help us realize the potentialities of our own analytical tools. We are moving in this direction. The work on input-output relationships in milk production undertaken by the U.S.D.A. in cooperation with several experiment stations was an important beginning in this problem area. Research now under way at the Beltsville laboratory on the relation of milk response to methods of forage harvesting under varying conditions is fundamental to our economic problems in forage production.

Still under the heading of mechanics, I would include developments in calculating equipment. Few of us work at institutions that now have the physical equipment to solve such complicated problems. Such machines exist. They may become part of our equipment in the future. Last spring I read of a problem which had been solved by use of an electronic calculator. The problem was something like this: given the transformation coefficients for engines used in a B-29 bomber at various revolutions per minute, altitudes, etc., at what speed and altitude should the plane be flown in order to carry a specified bomb load to the maximum distance for return when a given quantity of gasoline was available? Now, this is a cost-minimizing-returns-maximizing problem. It could find a counterpart in farm management. If my memory serves well, the calculations were completed in $3\frac{1}{2}$ hours. Twenty-three man-days were required to formulate the problem design. Had one man been employed to solve the problem with usual mathematical and calculating methods, he would have required some twenty years. The importance of such mechanical devices requires no more emphasis.

A second reason for my belief might be called habits. As George Stigler put it so succinctly, " . . . mathematical analysis has increased in popularity—or perhaps one should say that it has decreased in unpopularity." Mathematics is part of the environment of present day economists. Once I avoided any Journal article where there were any of those big, crooked $\int$'s or any dy/dq's. Now they are found in many of the articles. We should not object, for we are in a maturing science which demands greater precision.

But in the meantime—until we corral the production functions, until we all are on friendly terms with derivatives, until we have the opportunity and the ability to use new equipment—can we use the

model of economies of scale? Personally, I find the tool so helpful in appraising many of the problems of farm management that I must find ways to make it available.

Assistance in determining the least-cost point can come from a less precise and more time consuming method—synthesizing models for farms of different size by budgeting the influence of alternative set-ups with physical relationships based upon standards of performance (Figure 2). These standards are simplified versions of pro-

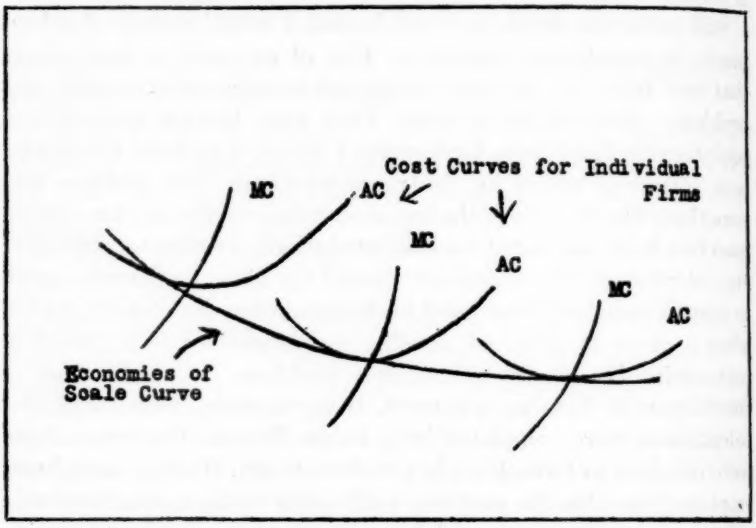

FIG. 2.—HYPOTHETICAL DETERMINATION OF ECONOMIES OF SCALE CURVE FROM INDIVIDUAL FIRM COST CURVES

duction functions. They represent superior but attainable levels of accomplishment under precisely defined situations when many of the usual variables are held constant. They are, in fact, response observations taken from points on the production surface developed from the inter-relationship of several important variables.

Standards of performance are of key importance in the logical transition from production functions and mathematical solution to selected observations and budgetary solution in developing the average unit cost curve for each farm. Budgeting can only be done when a finite value is available. Standards of performance provide such a value and, at the same time, largely meet the level of efficient resource utilization postulated in the scale technique. By

using various combinations of standards of performance, successive approximations of unit costs can be made to develop the shape of the average total unit cost curve.

The economy of scale technique neatly accomplishes several objectives. As the scale curve is drawn tangent to firm curves representing the most efficient utilization of resources at different sizes, it is necessary to collect and integrate physical input-output data for crops and livestock. Gaps in the existing information are indicated in the process. Appraising the costs of alternative combinations and uses of resources at a given price level will outline the shape of the average cost curve by pinpointing unit costs in the area above, to the left, and to the right of the least cost combination. The technique also sorts opportunities for cost reduction into those associated with changes in the size of business and those associated with organization and use of productive resources in the business. This use alone might be worth the entire effort. For thereby we can divorce ourselves from the concept often so ingrained in our thinking that bigness alone will solve farm problems. Given the production functions and prices, there is an optimum combination of resources for each size of firm. Often the rewards for moving toward this optimum combination far outweigh economies to be gained from larger size. In our study of economics of scale in dairy production made in cooperation with the Division of Farm Management and Costs, we found that under technology and prices assumed, unit costs were reduced only four percent in moving from an efficient one-man farm to an equally efficient two-man farm; no reduction occurred in unit costs between the two-man and three-man farm. Problems in resource utilization and profit center most heavily in optimum combinations for given sizes of farms.

Summary and Conclusions

In this appraisal of the application of static economic theory to problems in farm management we have explored three models within assumptions of pure competition and profit maximization. Our first, representing decreasing and increasing costs, was useful when one variable was combined with other fixed factors. A desire to incorporate more variables led to the second model. When the production functions and factor prices were given it was possible, with this model, to derive the optimum combination of resources which were imperfect substitutes for one another. Such concepts

put us in the heart of economic and farming problems. Extension of these concepts to even more variables was possible by adopting mathematical techniques of presentation in the economy of scale model. Usefulness of this model is limited by the lack of production function information and limitations in mechanical assistance. An alternative approach—although less precise and more cumbersome—can make use of this model by budgeting alternative organizations with physical relationships based upon standards of performance. These standards represent response observations from a simplified production surface with many variables held constant.

These theories and models do not solve problems. They assist in the application of the scientific method to farm management problems. Although such problems may appear in many forms they fall within the general categories of resource utilization and profit consideration.

LIMITATIONS OF STATIC ECONOMIC THEORY IN FARM MANAGEMENT ANALYSIS*

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FARM management research workers are in need of improved analytical methods. Much improvement can come within the framework of static economic theory, but new methods of analysis which can surmount the obstacles imposed by the concept of statics should be sought. It is the purpose of this paper to point out and discuss some of the limitations imposed by the concepts of static economic theory, although a number of criticisms of farm management analysis are made which are not limitations of static economic theory.

Static Economic Theory

First, what is meant by static economic theory? Although the term statics is widely used by economists, the meaning attached to it is not always clear and concise. In discussing the fiction of a stationary state Marshall says:

> "This state obtains its name from the fact that in it the general conditions of production and consumption, of distribution and exchange remain motionless; but yet it is full of movement; for it is a mode of life. The average age of the population may be stationary; though each individual is growing up from youth towards his prime, or downwards to old age. And the same amount of things per head will have been produced in the same ways by the same classes of people for many generations together; and therefore this supply of the appliances for production will have had full time to be adjusted to the steady demand."[1]

Although Marshall's analysis is basically one of statics, he has a way of bringing dynamics into the discussion without becoming disturbed by the fact that his analysis is not adequate to cope with it. He relaxes some of his restrictions on the stationary state and makes use of the term "representative firm" to serve the purpose of his analysis. Nevertheless, his analysis is still one of statics.

Hicks refers to economic statics as " . . . those parts of economic theory where we do not trouble about dating . . . " and points out

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* Journal Paper No. 355 of the North Carolina Agricultural Experiment Station, Raleigh, N. C.

[1] Alfred Marshall, *Principles of Economics*, The Macmillan Company, New York, 1948, p. 367.

that one's justification for using the term lies in the fact that it has a fairly well established place in economic terminology, and, even though it has not acquired precise meaning, it has at least a series of meanings which seem to be converging upon something useful.[2]

Stigler says a static economic theory "is one which explains the equilibrium position in the particular problem, on the assumption that the data of that problem do not change."[3] Static theory provides a system of price and production analysis under conditions of "given" preferences of the individuals composing the economy, "given" quantity and quality of the factors of production, and a given level of technology. The assumptions of static economic theory as used in this paper are as follows:

1. With respect to demand, or the consumption function, the preference pattern of individuals for various commodities and services is fixed and there is no change in the number and composition of the population.
2. With respect to supply, or the production function, technical knowledge remains unchanged, and the quantity and quality of resources remain constant through time, for example, capital equipment will neither increase nor decrease, land will not be depleted or improved, the size and capabilities of the labor force will remain unchanged. This means an absence of uncertainty and a presence of "perfect knowledge."

Static analysis is used to describe conditions of economic equilibrium at any point of time with "given" consumption and production functions, or a series of equilibrium points under different conditions of consumption and production. It does not and can not explain the process of movement from one point to another.

Methods of Farm Management Analysis

Methods of analysis in farm management have been confined primarily to those wherein the hypotheses fall within the framework of static economic theory. In this section I comment briefly on methods of farm management analysis currently in use and on some of the more common weaknesses associated with them. Criticisms pointed out in this section are criticisms lying within the frame-

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[2] J. R. Hicks, *Value and Capital*, The Clarendon Press, Oxford, 1946, p. 117.
[3] George J. Stigler, *The Theory of Price*, The Macmillan Company, New York, 1947, p. 25.

work of static economic theory and not limitations imposed by its concepts.

One method of analysis widely used in farm management research is the type associated with what may be called the method of "*Direct Comparison.*" According to this method, suggestions relative to the organization and managment of an individual farm are based upon the experiences of a large number of operators who are following the same type of farming as the operator whose farm is the object of study.[4] This type of analysis is based on the conclusion that farming systems and practices followed by successful farmers have been subjected to all of the forces, both economic and physical, that are at work in a given area; and therefore they are more reliable than those developed from experimental data or hypothetical models.

This *direct* method is incomplete. As most frequently applied, it is fallacious in several respects. First, it does not provide measures of efficiency of the use of resources and techniques of production in terms of an optimum for the group of farms used as a standard or guide. Second, there is no proof that if the individual farmer adopted the practices and system of farming found on the most profitable farms that income would be maximized or even increased. Third, systems of grouping data have resulted in attempted comparisons of features that are not comparable. Fourth, the use of the arithmetic mean often obscures the true relationship of the factors involved.

Fellows, in his discussion last year, pointed out, "Across-the-board recommendations to increase crop indices, to decrease investment per animal unit, to enlarge size of business, and the like, are in opposition to primary principles in economic theory and underestimate the individual management problem."[5] Little or no attempt is made to apply economic theory (static) to the problems facing the farmer. No account is taken of the fact that managerial ability varies from farm to farm, that institutional factors may be involved, that the goal of the farmer may not be simply profit maximization without qualifications, and that land and other resources may be heterogeneous in quality and limited in quantity. Use of the theories of marginal productivity and substitution are

[4] G. W. Forster, *Farm Organization and Management*, revised edition, Prentice-Hall, Inc., New York, 1947, p. 97.

[5] This *Journal*, Vol. XXXI, Number 4, Part 2, p. 1058.

ignored. It is assumed, apparently, that the most successful farmers have dealt with these problems satisfactorily, or that the research worker has no contribution to make to their solution.

A second method of approach to farm management problems used extensively may be called *Budget Analysis*. There are many variations of this method, but in general the principles involved are the same whether they are associated with the standard method or with the method of substitution as used by Forster,[6] the budget analysis as used by Black[7] and others, or the development of models as used by Heady,[8] Gale Johnson,[9] and others. The major variations occur in the collection and analysis of the data necessary to use the budget approach rather than in the construction of the actual budgets, models, or farm plans. A budget as used here is simply a plan for the use of resources based on specified factor cost and output relationships. The forward looking plan is based on anticipated cost and output relationships. The validity of this method depends largely on the accuracy of the input-output data and on the extent to which assumed prices of resources and products are realistic. The method has real merit in testing alternative practices and systems of farming where reliable input-output relationships are known. Different farming systems can be tested under several assumptions with regard to prices and the outcome can be demonstrated in each case. Also, the budget approach is applicable to the individual farm regardless of size or system of farming.

However, the method is not without criticism. First, reliable input-output data are difficult and expensive to obtain. Mean relationships for large numbers of cases are not necessarily sufficient. The data should have application to the resources of the particular farm under study. Second, although the method is useful in the analysis of farms within given institutional arrangements, it is not sufficient for analysis of the institutional system; nor is it an adequate tool for analyzing the expected economic consequences of large numbers of farms acting simultaneously. Third, without an analysis of each farm in accordance with the individual's goals and capabilities, no satisfactory procedure has been developed for dealing with differences in managerial ability and in individual

[6] G. W. Forster, *Farm Organization and Management.*
[7] John D. Black, et al., *Farm Management,* The Macmillan Company, New York, 1947.
[8] This *Journal,* Vol. XXX, Number 2, p. 201.
[9] This *Journal,* Vol. XXX, Number 1, p. 117.

preferences. Fourth, theoretical and practical difficulties arise in connection with the use of marginal analysis. The difficulty of getting reliable data was mentioned above, but the problem of getting reliable input-output data in sufficient detail to make direct use of marginal analysis in developing a complicated farming system is too much for most research workers in farm management. Such data, if it were available, would have application to the individual farm with reference to the determination of scale, but not with reference to value determination of resources.[10] Fifth, satisfactory procedures have not been developed to make full use of the theory of substitution. Here again, the complex nature of farming systems with competing, complementary, and supplementary enterprises, and the accounting difficulties involved where you have joint products and where joint factors are used to produce many different products, raise formidable barriers to the collection of data necessary to make full use of this theory. This is not a limitation of the theory itself, but a lack of the development of techniques to make full use of the theory.

Limitations of Static Economic Theory

Research in farm management is designed to solve problems with regard to the organization, management, and operation of farms. These problems are associated with change. The research worker is trying to shed some light on the changes which should be made and the way in which they should be made. Yet, as pointed out previously, the underlying concepts of farm management analysis are basically those of static economic theory. As noted earlier in this paper static analysis describes conditions of economic equilibrium under a given set of conditions, or perhaps a series of equilibrium points under given sets of conditions. An important problem is the path or process of movement from one point to another. Many problems arise during this process, problems of major importance to the farmer and the research worker, problems which the instantaneous adjustments of static analysis are not equipped to handle.

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[10] In this latter sense, marginal productivity theory has no application to the individual firm. The price of resources to the individual is determined in the market place within the institutional framework of the economy and not by the productivity of that firm alone. In farm management analysis the product is sometimes used to compute the value of the resource.

The set of assumptions which underlie static analysis remove it from the conditions of the real world. The fact that static analysis is inadequate to deal with the problems involved in the processes of change between assumed equilibrium points, may well be one reason, along with many others, for the existence of a large gap between the organization and practices in use on farms and those which our studies indicate it would be most profitable to use. This gap may be a result of a lack of knowledge, or of uncertainty, and/or of limited resources. Most of our farm management studies view the problems of the farmer from an ex post position, whereas the farmer in making decisions is forced to face the situation from an ex ante position in which uncertainty is a major factor.

Farm management analysis within the framework of static theory can shed little light on the question of risk and uncertainty. Input-output relations in agriculture are affected by weather, insects, diseases, and technology, all of which are subject to change. The problem of predicting or anticipating these changes with any degree of accuracy is a very real one to the farmer, but one which static analysis is not adequate to handle. Weather conditions during the critical growing season may be much more important in determining the rate of application of fertilizer than minor changes in the price of fertilizer or the price of the product. Considering risk and uncertainty, the agronomist's recommendations for rate of application of fertilizer may not be as far wrong from the standpoint of maximizing returns as some economists would have you believe. In purchasing farm machinery, or in constructing buildings, the farmer is faced with the possibility that the machinery and buildings may have become obsolete before he has recovered his investment. The uncertainty involved in cases of this kind, or the lack of a satisfactory method for predicting input-output relations, affects the farmer's decisions. Static economic analysis does not provide an answer to questions of risk and uncertainty.

When the assumption of a "given" consumption function, as used in static analysis, is removed, the problem of predicting prices arises. The fact that prices may change adds to the risk and uncertainty the farmer must face. Also, it raises difficult problems for the research worker, problems about which little has been done in farm management analysis.

Probability ratios can be used to shed some light on some of the uncertainties, such as weather, but in many cases the data are in-

adequate or expensive to collect and analyze.[11] For items of uncertainty that involve discovery and invention in technology and tastes and preferences of individuals, and, to some extent, the size of the population in the economy, the determination of probability ratios is not possible.

The rapid development of technology is increasing the importance of scale of operations by enterprises in attaining efficiency in agriculture. The introduction of highly specialized equipment tends to be cost reducing in its effects, provided it is associated with sufficient scale of operations. Farmers who have limited resources, for example land or investment funds, are forced to choose between two alternatives: (1) a greater degree of specialization and inflexibility in an effort to reduce cost (assuming no change in anticipated economic conditions) and (2) diversification and flexibility in an effort to reduce risk (which, ex post, would show a higher cost compared with specialization if the anticipations prove correct, but a lower cost if they prove to be incorrect). Stigler,[12] Heady,[13] and others have discussed this problem in terms of flexibility and cost of production. The inflexible firm (or farm) would have a U-shaped average cost curve whereas the addition of flexibility would tend to flatten the cost curve. The ends of the flexible cost curve would lie below, and the center would lie above those of the inflexible cost curve.

Conclusion

I have left the task of explaining the usefulness of static economic theory in farm management analysis to Mr. Fellows, the task of discussing new theories and their usefulness to Mr. Heady, and the discussion of needed developments in economic theory and farm management analysis to Mr. Johnson. This leaves my paper with a definite negative tone; but I am convinced that new techniques in farm management analysis are badly needed. Some of these can come within the framework in which we are now doing most of our work, namely static economic theory. Others must be found in dynamics, but must be clarified and adapted to the solutions of the problems of the farm.

[11] Work with weather data in North Carolina in determining the probability of occurrence of suitable field working conditions for mechanized equipment does show signs of being useful.

[12] George J. Stigler, *Journal of Political Economy*, Vol. 47, June 1939.

[13] Earl O. Heady, this *Journal*, Vol. XXXII, No. 2, May 1950.

DISCUSSION

S. A. ENGENE
University of Minnesota

Mr. Fellows and Mr. James have done a good job of dealing with a big problem in a short time.

I agree with a large number of their ideas, but I must disagree with some details. I agree with both in stressing the importance of theory in future work in farm management. Farm management analyses of the past have utilized economic theory to only a limited extent. This is not necessarily a criticism of that work. When farm management research in this country started about fifty years ago, direct observation of farmers' actions was undoubtedly the most fruitful source of information and ideas. Such observations are an important base on which to build theory. I believe the early workers in farm management used appropriate tools for that stage of the development of the field; and they used those tools very effectively. In fact, they did such a thorough job that use of the same tools during the past ten to twenty years has not revealed many important new ideas. To make another step forward, we will have to use a new tool to build upon the foundation that has been built. Economic theory holds promise as such a tool.

I must disagree to some extent with Mr. Fellows' statement of the function of theory. As I understand his paragraph, he says that theories are simplifying devices which help us to grasp concepts. He says "Theories and models do not solve problems." I believe the function of theory is more than that. The goal is to develop theories sufficiently complete and realistic so that close approximations to solutions of problems can be obtained from them. The goal is probably unattainable, but that is the direction in which we must move. The development of theory must start with the problems and observations of the field. Past research in farm management and other fields provides such a starting point. These observations will suggest assumptions which provide the backbone of the theory. The theory will be developed by logical deduction from the postulates. The theory must then be tested by application to situations in the field or laboratory. Discrepancies between what the theory predicts and what we find will provide the basis for modification of the theory. This reciprocating action between observation and development of theory will have to continue for a long time. In order that we may reach our goal of a theory which will give close approximations to solutions of problems, our basic assumptions must be realistic and complete, and our logic must be correct.

If this is accepted, then static economic theory has some serious limitations. First, its basic assumptions are incomplete and incorrect as compared with the situation faced by farmers. Second, the soundness of the theory cannot be completely tested, because we cannot find in our world the static conditions under which to test it.

Can we then agree with Mr. Fellows as to the usefulness of static economic theory in farm management analyses? In one sense, I would like to

go farther than he does. Static theory can provide a stepping stone to a more adequate theory. Most of us must develop our ideas in small chunks in order to handle them. The number of concepts and their complexities are less in static than in dynamic theory. When we grasp those ideas we can move on to others.

In general, however, I take a more pessimistic view than Mr. Fellows. At best the static analyses are approximations. I agree with Mr. James that those approximations may be too big for practical use; they may give the wrong degree of movement, or they may give the wrong direction. The degree of error may vary with different types of problems; probably we must spend some time to determine the types of problems for which we can use this technique.

Some money must be spent to develop basic data needed to test our theory. It would probably be unwise to assemble more data than are needed for that testing. Some of this information might possibly be assembled quite inexpensively. During the past year, we have obtained some information of this type from farmers by the group discussion method.

Even though I place some limits on the usefulness of static economic theory, I hope that we will attempt to use and develop theory to a greater extent than in the past.

DISCUSSION

L. C. CUNNINGHAM
Cornell University

The burden of the discussion in Mr. James' paper is on the static versus the dynamic in economic theory. His general conclusion is that since economic conditions surrounding the actual farm are dynamic, static theory can shed but little light on the problem. In contrast to James, Fellows places emphasis on economic theory applied to farm management problems, static or otherwise; his argument is that theories and models are simplifying devices in farm management research.

Mr. Fellows is a member of that newer fraternity of economists the members of which talk about 'theoretical models' meaning hypotheses, 'production functions' meaning relationships or input-output ratios, and 'firms' meaning farms. Members of this group are extremely critical of the farm management research of the past forty years. One states:

"... many of the so-called principles of farm management take on hollow or erroneous meaning at some point."

I am in agreement with James that farm management research workers are in need of improved analytical methods. But I believe most workers in this field will hardly agree:

"... the grouping of farms on a type-of-farming, type-of-enterprise, size-of-business or any of the familiar bases used in farm management has generally failed to give help to individual farmers in their management problems."

Why all this criticism of farm management research? Has too much re-

search been directed at "all-purpose data" to answer all the questions at once? Is the search confined to looking for new principles of farm management?

First, continued studies along these conventional lines have shown refinements to some of these principles. The relation of size to income is not the same in different periods of economic conditions or on different grades of land.

Second, new farmers are coming along, of course, who are best taught these economic relationships from data of recent origin, not those collected in father's day.

Third, all farm management workers should be receptive to constructive suggestions to improve the quality of their work. The point James makes, for example, regarding over-use of arithmetic means appears valid. Improvements in sampling methods and stratification of data are being put increasingly into practice.

Lastly, there is not general disagreement with the repeated statements by Fellows, James, Wilcox, Heady, et al., of the need for more data concerning physical relationships in farming. But, shall we drop everything else and go all out for models or physical input-output data? Or, shall we continue to improve our hypotheses, sampling procedures, methods of analysis, and place additional emphasis on the physical relationships, in our so-called traditional farm management research? I leave the answer to each of you individually in light of these two thought-provoking papers which have just been presented to us.

DISCUSSION

R. E. L. GREENE
University of Florida

These two papers present a good discussion of the application and limitations of static economic theory to farm management problems. Mr. Fellows' paper elucidates the application of static economic theory by explaining three models within the assumption of pure competition and profit maximization. Dr. James' paper discusses some of the limitations imposed by the concepts of static economic theory as an analytical tool in farm management research.

Dr. James says that the assumption of the static quantity and quality of the various factors affecting the problem means an absence of uncertainty and a presence of "perfect knowledge." This is probably an over-statement of the situation. The assumption is made that the factors will remain unchanged in this method of analysis, not because the people using it do not recognize that there is uncertainty or that they possess "perfect knowledge" about various conditions, but because they do not know the amount of the uncertainty and are unable to predict what the various changes will be. Some attempt is made to take these factors into consideration by working out a series of equilibrium points under different conditions of consumption and production.

Fellows rightly points out that theories and models act only as guides that help in formulizing specific problems and in developing hypotheses relating to the problem, and help in selecting appropriate analyses to test the hypotheses.

The type of model needed depends on the particular situation under consideration. The nature of most farm management problems is such that a number of variables must be considered. This involves models of a more complicated design which require the use of mathematics more difficult than many of us are able to handle.

One serious limitation of applying the model that accurately portrays a given situation is the inadequacy of physical input-output data which are needed in determining given marginal rates of substitution. The job of obtaining these data is a big one and it will require time. Many of the functions developed in one area will not apply in another area. Also, to obtain the information we desire will increase the cost of conducting certain physical experiments beyond the resources of the average experiment station.

In his criticisms of methods of farm management research, Dr. James discusses the method of *Direct Comparison* and the *Budget Method.* He listed several valid criticisms of these methods. In criticizing the method of *Direct Comparison* he implies that, since the relationships usually show that the farmers with high rates of production, larger size of business, etc. usually have higher incomes, the automatic conclusion is drawn that Farmer A could increase his income by increasing his rates of production or size of business. The relationships express the general situation, but the resources and problems of the individual farmer must be appraised before definite recommendations are made for his farm. I admit research workers have usually stopped in their analysis with the presentation of relationships without trying to develop recommendations for specific situations.

Dr. James says of the *Budget Method* that the budget approach is applicable to the individual farmer regardless of size or system of farming. This statement is true when the budget approach is used to test alternatives under different assumptions. However, when the budget method is used to develop so-called "standard systems," the farmer has the same job of deciding whether he can adapt these systems to his situation as he does in deciding whether he should increase his crop yields under the method of *Direct Comparison.*

Dr. James pointed out the importance of risks and uncertainty in affecting the decisions of management and the difficulties of taking these into consideration in farm management analysis. He referred to the use of probability ratios to shed light on some of the uncertainties such as weather. Such ratios are of value in estimating the minimum amount of use that can be expected from a given piece of equipment due to weather. They are of limited value in adjusting farm plans due to abnormal weather, for each year the probability of normal weather is the same.

Farmers in all areas have been faced with many adjustment problems due to increase in farm mechanization, changes in technology, and other reasons. These have enlarged the importance of management and made the

job more complicated. They have also made it more difficult for the farm management research worker. Many new answers are needed. In obtaining these answers, we have attempted to use some of our analytical methods to do jobs for which they were not intended. But until we develop the type of analytical tools we desire, let's make the best use of those we have and work to improve them. It is easy to say a certain method does not do the job. It is much more difficult to suggest what should be used as a substitute.

APPLICATION OF RECENT ECONOMIC THEORY IN AGRICULTURAL PRODUCTION ECONOMICS*

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Iowa State College

THE role of theory in applied science is now well recognized. It provides analytical models which serve as the relevant hypotheses in any field of applied science. The research process is a two-way flow including (1) the deductive phase of the investigation in which attempt is made to identify the relevant variables and hypotheses (the formulation of the model) and (2) the inductive phase in which inferences are made from quantitative observations back to the original theory. Theory is a (mental) labor-saving device in the sense that the individual research worker does not have to "start from scratch" with each investigation but can draw upon those theories or laws which have "come to be accepted over time" in the formulation of hypotheses and empirical procedures.

With this brief summary of the role of economic theory in applied research, we outline some "recent" areas of pure economics and their application in agricultural production economics research (our assignment, though the material is not new). We do not propose that basic principle is available currently in a quantity and form which provide a guide for empirical research in all problems of agricultural production economics. However, it is obvious that economic principle as a useful tool has certainly been developed beyond its application as an analytical guide in applied research. We do propose that the problem of empirical observation is more serious than lack of theory for applied research. While many of the economic models are useful to and accepted by any research worker who can do arithmetic, little has been done to provide their empirical counterpart as a guide to farmers and administrators. Finally, it should be remembered that if a relationship is given in general form, it does not hold that the theory is unadapted for other specific situations. It is up to the individual worker to adapt the general principle to linear relationships, negative coefficients, etc.

Theory and Scope of Agricultural Production Economics

One important relationship between recent theory and applied research deals with the scope of agricultural production economics.

* Journal paper J-1860 of the Iowa Agricultural Experiment Station, Project No. 1135.

The relevant body of economic law is the so-called principles of production. In terminology of the last decade, the laws of production are synonymous with the principles of resource allocation (resource efficiency). While the principles of resource allocation historically have attained their greatest degree of refinement and acceptance in application to the individual firm as an economic unit, theory of recent years has been extended and refined as it applies to industries, the national economy, or other economic units. It is true that classical categories of economics included production, consumption, distribution and value (market) relationships for the economic system. However, the use of "production possibility" (iso-resource or transformation functions) relationships in the extended manner of Lerner, Reder, Myint and Samuelson (to mention a few) further indicates the "universality" of production principles. These principles define (mathematically) the most efficient resource use irrespective of the nature and magnitude of the economic unit. They refer to the optimum allocation of capital, land, labor, and other human resources in the organization of production whether on a national, state, farming area, individual farm, or segment of an individual farm, basis. The laws of production are also universal since the *general conditions* of maximization (efficiency) apply irrespective of whether the measure is one of physical product, value of output, dollar profit, social welfare or other choice indicator. Too, their variations apply equally regardless of the particular economic unit being analyzed or the quantities being aggregated. While maximization of profits to some individual farms (under certain conditions) need not result in the greatest product to the nation as a whole, it is also true that maximization of returns to a particular unit (such as a single cow, acre, etc.) within a farm need not result in the greatest return to the farm as an entity. Thus the agricultural production economist has a set of universal principles "explaining" (providing the logic for) the most efficient use of resources (a) within farms, (b) between farms, (c) between agricultural regions, (d) between agriculture and other industries and (e) over time. The choice of the level of analysis is largely a question of the individual research worker's interest, and perhaps his institutional assignment. The numerous specializations within agricultural (production) economics around various aggregates of output, especially around individual factors of production,

are based on historic and institutional precedent rather than on economic science. If one attempts to study labor (e.g., time and motion studies) apart from capital and land, the investigation necessarily centers on engineering and sociological or psychological aspects. A study of land (e.g., land "economics") apart from other resources necessarily becomes one in the geographical aspects of soil and legal institutions. Production is forthcoming and economic problems in use arise only in the sense of the combination of two or more factors and products (viz., the principles of production economics or resource efficiency). Greater recognition of the fact that the principles of production relate to all factors and levels of production would do much to systematize and increase the productivity of applied analysis.

Macro Analysis

Although not of today's origin, macro (aggregative) analysis is still considered a recent development in economics. Certain implications of this branch of theory are important in agricultural production economics. Inferences which focus on the individual farm can indeed "backfire" unless aggregative relationships are also recognized. For example, the research worker who studies a sample of farms and infers from the findings of his sample that greater returns to individuals, or even greater utility to the consuming economy, would be forthcoming were farmers to shift from product A (perhaps corn) to product B (perhaps hay) or use a greater amount or form of capital may find that the outcome is in conflict with his predictions if masses of farmers follow his "recommendations." If the production economist expects to influence any important segment of agriculture his predictions can have content only as they relate micro and macro adjustments. The two levels of analysis are not "distinct" but are interdependent and complementary. Because of interactions within groups of firms the inferences drawn from study of one or a sample of farms may not hold true for all farms taken as a group, and may err in direction as well as magnitude, Too, the behavior of aggregative groups is more stable than for individual units (or samples) and thus provides a better basis for deriving empirical relationships. Some of the more important regional and national problems of production adjustment are given in terms of aggregates.

General Equilibrium and Inter-regional and Inter-Industry Analysis

We put forth the proposition that the traditional farm management survey, or farm record summary, has not served mainly as a study in equilibrium of the individual farm, but must be justified more nearly in the vein of general equilibrium analysis. The procedure has been to employ a cross-sectional sample of farms in various regions for comparing (by means of efficiency indices as labor income, management return, etc.) returns when resources are organized in various fashions and quantities. Supposedly, any differences in returns between farms can be used to suggest how any one farm should reorganize its resources. However, heterogeneous samples and data of this nature perhaps better serve as indicators of disparity in resource returns between farms and farming regions rather than of possibilities of increased returns from reorganization of resources within any single farm of the sample. Since it has thus been the historic base of farm management studies, the concept of general equilibrium analysis should be refined and extended. This proposition is implicit in discussion of macro analysis.

General equilibrium theory deals with the consistency of the positions of various organisms in the total economic system under consideration. One can consider a single farm as the *economic unit* and investigate the consistency of the allocation of resources (a) between different acres planted to the same crop, (b) between different crops, (c) between crops and livestock, (d) between different time periods, (e) etc. In this sense we have a "general equilibrium" analysis exactly identical in method were we to start with farms as the smallest unit in our "larger system." Analysis of the equilibrium of an individual unit such as a farm, however, has historically been looked upon as *particular equilibrium analysis*, although identical in logic. Thus in our proposition that production economic analysis can have greatest meaning as an area of general equilibrium analysis we refer to investigations wherein the consistency of resource allocation is tested (1) within farms, (2) between farms in the same area, (3) between different regions, (4) between agriculture and other industries and (5) over time. Part of the direct focus of farm surveys has been on the movement of resources between agriculture and industry. Since the time of and including the early study of G. F. Warren, farm surveys have been used to

compute labor returns as an indication to farm people whether or not the productivity of their resources is greater in farming or other industries. Since a general equilibrium model has been implicit in and underlain traditional farm management studies, research workers should give direct recognition to the fact and refine and extend its use. The objective is not only one of increasing the welfare of the individual farmer, but also of bringing about a more efficient use of all resources from the standpoint of the total economy. We reiterate that the production economist can accomplish more in this direction than in extending the profits of the total population of existing farms. The demand for agricultural products in general is so inelastic that any significant readjustment in the ratio of output to factor input must result in a smaller rather than a larger aggregate income. Were the focus only on the firm with profit maximization as the criterion, the relevant body of economic principle is that of monopoly. Rather than indicate methods of how resources might be rearranged to increase productivity, effort should center on the most effective method of organizing farms into monopoly associations, reducing output and fixing prices in order to maximize revenue.

Refinement and extension of the general equilibrium approach in production economics can provide analyses of increased value both to individual farmers and national policy adjustments. Conceptually, it means estimation and equation of the marginal productivity, in terms of value or other appropriate criteria, of the various classes of resources on an intra-farm, inter-farm and inter-regional basis. The problem of empirical research is one in measurement and identification. How does one "observe the values" of the direct utility of farming as an occupation; should the "love of farming" be one of the important commodities produced in the industry? What inferences can be drawn from productivity coefficients which compare a competitive industry as agriculture and the monopoly organization of other industries? The questions posed should serve in themselves as the stimulus for additional research.

Firm-Household Interrelationships and Choice

Traditionally, economics has been portioned out under the labels of "production," "consumption," and other distinct packages. While these relationships historically have been brought together

in the concept of the market (supply and demand) and other notable exceptions, it has been through the recent efforts of Marshak, Reder, Friedman, Schackle, Von Neumann, and Morgenstern that emphasis has been directed upon the interdependence of production (the farm as a producing and decision-making unit) and consumption (the household as a consuming and decision-making unit) relationships in "explaining" the behavior of individual economic units, or in "defining" (setting forth the logic of) the optimum use of resources. It is known that the firm and household in agriculture are closely knit not only physically but also in respect to the supply of resources and the decision-making process. Yet this has been a highly neglected area of analysis. Our farm management studies have assumed profit, or other monetary measure of resource return, alone as the criterion of efficiency. It is obvious that farmers could make greater profit (for a short time if capital is available) were they to work 18 rather than 12 hours per day. However, at some point the direct utility from rest and leisure becomes greater than that derived from goods bought with greater farm profits. Theory is already available for problems of this sort as is illustrated in the overly simplified model of the Figure below.[1] The curve PP' represents the production possibilities facing the producer with given resources; all of the resources

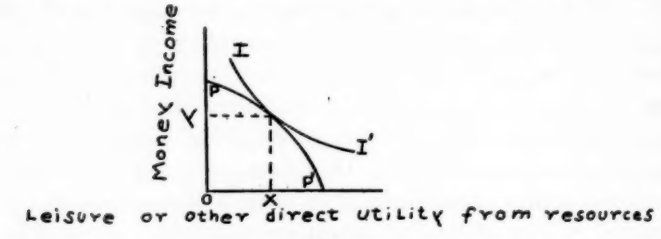

FIG. 1

can be employed in producing dollar-profit, all can be employed in direct utility (spending the capital funds, using labor in leisure, fishing, etc.) or any combination of these two possibilities (consistent with PP') can be selected. Curve II' is the traditional indifference curve relating the values (the marginal rates of substitution) which the individual places on the direct utility from "resources"

[1] We present the figure to illustrate (a) that current theory can be adapted to situations where "theory is apparently lacking" and (b) that many so-called "non-economic" decisions can actually be analyzed in an economic framework.

(spending a day fishing) as compared to consuming commodities which can be purchased with farm profits. If total utility or satisfaction is to be maximized, then the individual or family should use the given resources to produce OY profits and OX direct utility; e.g., tangency of the two curves indicates equal marginal rates of substitution. Total satisfactions would be decreased by allocation of more resources (family labor, reinvestment of capital) in the direction of profit. Thus our models which relate the firm and household are a variation of a firm taken alone. The difference is given in the fact that our choice function (curve II') is now a utility rather than a price relationship.

Many important problems hinge around the interrelationship of production and consumption in agriculture. The farmer can rationally disagree with the researcher who indicates that hay should be put up by hand rather than with an automatic baler because of lower costs. He may be interested in maximizing utility rather than profit. The problem of low income and the attendant resource problems in agriculture must be partly analyzed in this framework. To what extent is it true that the values of the subsistence farmer (the slope of curve II') are such that he prefers a lower income, the retention of mores and leisure time (or coon-hunting) to the greater monetary rewards in other locations or industries (hence that the present use of these resources represents an optimum)? To what extent will relative values (curve II') be changed if forthcoming generations of "mountain farmers" are exposed to alternative opportunities over the United States? To what extent and in what manner can the productivity or earning capacity (the slope of PP') of these people be increased in a form which will increase their welfare as well as that of the total economy?

The phenomenon of capital formation in agriculture is partly a firm-household or production-consumption interrelationship about which little is known. (The problem and solution are given conceptually in Figure 1 if the Y axis represents one time period and the X axis represents a later period.) To what extent does the farm family forego consumption at the present in order to provide income in the future? Does capital accumulation become an end in itself and does the family attempt to accumulate a fund which itself will provide consumption during retirement, or does it attempt to accumulate a larger fund of which the earnings will allow the "desired" level of living? Since soil conservation is both a prob-

lem in production and consumption in time, it falls in a similar frame of analysis.

The risk-uncertainty complex is also one in which production and utility are interrelated in choice-making. The minimization of uncertainty may stand at a level with maximization of returns as the criterion of choice under "variable" conditions. Too, the undertaking of uncertain ventures may itself provide utility, for example, to wealthy cattle-feeders and others (especially those who play slot machines and other games of chance). Finally, a direct production-consumption problem which should receive greater attention is the productivity of capital invested in the human agent. Although production economists have devoted a large amount of effort on productivity analysis of capital in the form of livestock, machinery, fertilizer, land, etc., the productivity of capital investment in the human factor has been a "forgotten" area.

Production Dynamics and Instability

The major portion of research in production economics has assumed static theory and the absence of risk and uncertainty. Traditional farm management research has centered on a model of an owner-operator firm with a 100 percent equity operating in a timeless economy, and with complete information (probabilities of 1.0) about a future in which change is absent. As any farmer can testify, the business apparatus which he directs is not an economic cadaver of this sort and his decisions are conditioned accordingly. A study indicating the most profitable choice of last year may be completely misleading in the year ahead. While one operator with a full equity in $100,000 may rationally choose (because he has a stake great enough to carry him through the "lean" into the "fat" years) enterprise A which averages a 20 percent return over a long period but is associated with great variability (and uncertainty) between years, another operator with a 40 percent equity in $10,000 may be equally rational in his choice of enterprise B which averages only five percent but which has low year-to-year variability. Because of his small "stake" and low equity, an "unfavorable turn of the cards" under A may force him from the game and he has no opportunity to reap the great rewards with the eventual favorable runs of the cards.

While neither exactly new nor sufficiently developed, the logic

of dynamic production (the relationship of one time period to another) theory or risk and uncertainty stands to be of greater value as a guide in decision or choice-making than many static empirical studies. Too, the concepts developed to date provide a framework for assembling data and observations which can prove helpful. For example, Knight's and Hart's distinction between risk (where parameters of the joint probability distribution are known) and uncertainty (unique environments in which parameters of the distribution are given only in the form of expectations to which subjective probabilities alone can be attached) provide the basis for (1) classifying risks which the firm can incorporate into costs within its own structure, through other commercial firms or institutions provided by society, (2) estimating the degree of uncertainty associated with different enterprises and farming ventures through the derivation of the skewness, kurtosis, variance, and other properties of the relevant distributions from historic observations. Although these ex poste "measures of uncertainty" need not reflect the future, we believe they can serve as rough guides to the uncertainty (income variability) associated with various alternatives. In the same vein it is perhaps possible to suggest the components of total income variance associated with market (product and factor prices), technical (yield), and technological uncertainties. Greater knowledge of the degree of uncertainty surrounding different ventures and the components of total income variance, even though less than perfect, would be of value (1) in suggesting different lines of action to operators under varying capital positions and (2) evaluating the returns to farmers and the costs to society of crop insurance, storage, irrigation, and other "stabilizing"policies.

Planning Horizon and Expectations

Tinbergen's[2] and Lange's[3] concept of a planning horizon has relevance both in (1) conditioning the recommendations to fit the peculiar capital, tenure, or life expectancy of individual farmers and (2) determining the extent to which the time span of decisions affects farming efficiency. The theory of expectations, while still in the embryonic stage, obviously points the way to empirical research and farm policy recommendations. On the one hand,

[2] *Econometrica*, Vol. 1, 1933.
[3] *Price Flexibility and Employment.*

theory such as that of Steindle[4] and Schackle[5] leads to studies of the manner in which farmers formulate price and technical expectations and the consequences of the different systems they employ. On the other hand, it is entirely possible for the research worker to formulate expectation models and make empirical tests of the success of each. For example, the (historic) probability of success of a yield expectation model based on the yield of this year, the past five years or the trend can be tested in the Cornbelt. Complete random yields, series of favorable and unfavorable yields or other alternatives can be tested as expectation models in the Great Plains. Perhaps one might even employ the "opposite of outlook recommendations" as a price expectation model worthy of testing.

Theory in respect to methods of meeting uncertainty (reducing income variance) is quite well developed and can be useful both in (ex ante) recommendations to farmers and in measuring the (ex poste) costs (individual or social) of instability. Obviously, income variance can be lessened by choice of alternatives which have low yield and price variance. A combination of enterprises for which the changes in price or yield have a correlation coefficient of -1.0 is preferable to one where the correlation is zero, which in turn is preferable to a combination with a correlation coefficient of $+1.0$ (if minimum income variance is an index of choice). Hart's concept of time flexibility and the convergence of expectations and realizations has obvious application in the selection of enterprises with production periods of different lengths or investments which are transformed into product over varying time spans. Stigler's[6] model of cost flexibility for a single-enterprise firm and the writer's[7] theory of allocative flexibility in a multiple-enterprise firm suggest the design of (research and) operating plants for the purpose both of increasing income and lessening its variance over time. The concept of cost flexibility furnishes a base for cooperative studies with engineers to provide buildings and systems of production which exchange the alternative of (a) either getting rich or going broke for (b) one of lower income in case of a favorable turn of events but with less extremes in either case, hence a greater probability of survival in case of unfavorable contingencies. The concept of allo-

[4] *Oxford Economic Papers* No. 5.
[5] *Theory of Economic Fluctuations.*
[6] *Journal of Political Economy*, June 1939.
[7] This *Journal*, May, 1950.

cative flexibility can be used in the same manner and also is a precaution against "foolish" recommendations to two or more farmers that they should follow identical courses if all are to maximize profits. Even though equal in respect to environment of capital, managerial ability, soil resources and price relationships, all can not maximize profits by producing identical combinations if their short-run plants differ.

Use of Capital and Increasing Risk

Finally, the principle of increasing risk devloped by Kalecki and extended by Steindle stands to throw insight both on the use of capital and the scale of operation in agriculture. Whereas our farm management study beseiges the operator with recommendations to "increase volume and hence profits," little cognizance is given the fact that an increase in scale necessarily requires greater assets. If, as in the normal case, greater assets are forthcoming only as funds are borrowed, the "probability" of insolvency (the degree of risk) in case events turn unfavorable must increase as the firm's equity declines. In this chain of logic the farmer should discount returns at increasing rates as scale expands and equity declines so that he attains a subjective equilibrium short of that recommended by studies based on a sample of farms with 100 percent (or "transformed" to this basis through accounting procedures). In fact, such studies as those of Hurwicz and others would lead to construction and testing of decision models which include the theory of assets along with other elements of the environment conditioning behavior.

A bit of irony growing out of farm management research of the past is that it has had little to say about the management factor itself. While management per se is partly a study in psychology (the inherent capacities of the individual) it also has interesting economic aspects. If one follows N. Kaldor,[8] the role of management is largely associated with change and uncertainty. Thus an interesting problem posed by the theory is this (since the need for management arises because of change): While technological advance and other forms of progress allow economic gain, what portion of the total gain is offset in the management or coordinating which must be invested because of change?

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[8] "Theory of the Firm," *Economic Journal*, Vol. 13, 1938.

Returns to Scale and Farm Size

A "confused" area of economic knowledge is that dealing with returns to scale in farming. Farm management studies historically have suggested highly increasing returns to scale in agriculture; e.g., consistently greater residual profits to larger farms. Yet the slow rate at which farms change in size even in highly mechanized areas suggests the hypothesis of constant returns to scale; hence, that small farms can compete successfully with larger farms. While the problem of the size of the firm falls partly in the field of risk and uncertainty or the non-static theory of production (hence the notion above that small and large firms can exist in equilibrium side by side while a competitive industry is retained), the empirical counterpart of the static concepts of scale have never been derived for agriculture, even though the theory is "old" and widely accepted by economists. While farm management studies over four decades have examined the relationship of returns and farm size, no one study exists which gives a clear understanding of the nature and extent of economies to scale in farming. Nowhere can one find conclusive cost functions applied to agricultural firms or enterprises, even though cost studies have been one of the historic assignments of farm economists. Many studies have shown *the* "average cost" (a single point on an average cost curve) but as most people are aware, there is no such thing as *the cost*.[9] The cost coefficients (total, average, marginal, etc.) could be used by a greater range of farmers; also they could be applied in assessing the effect of national adjustment programs; viz., the effect of limiting production payments on a farm size basis per the Brannan plan.

It is entirely possible that an economy of so-called family farms must result in inefficient (high cost) crop production, but does not result in inefficient livestock production. While the public "argument" centering around farm size is actually one of variable proportions (the possibility that more and more acres can be farmed with a given quantity of capital and labor) rather than returns to scale, there is need for empirical estimates under both concepts. Only then can more objective analyses be made of farm size.

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[9] Nearly all studies in production include some aspect of costs functions. For illustration of how erroneous inferences may arise because cost functions are not recognized, see the example of haying in Heady, "Elementary Models," this *Journal*, May, 1948.

Estimation, Model Building, and Simultaneous Equations

Productivity analysis of the general equilibrium (or even particular equilibrium) nature mentioned above (the theoretical apparatus) supposes that statistical or empirical apparatus is also available for estimating the relevant coefficients (marginal and average productivity of the various resources at different levels of use, etc.). We do not propose that worthwhile study in the area cannot proceed without the application of highly refined or complex empirical methods, or that it must await the development of still more efficient methods. Yet we do suggest that applied research is far behind the developments of both the theoretical and empirical apparatus in economics and econometrics. While there may be grounds both in "common sense" and basic logic for rejecting the methods in question, it is indeed probable that production economists have devoted too little attention to the testing of the techniques currently available.[10]

One void in the analysis is the derivation of "general production functions" for estimating the productivity of broader categories of resources, such as labor, capital, and land (in contrast to more restricted "physical" production functions, which relate, for example, fertilizer input and crop output). The concept of production functions should be a basic tool in the kit of any production economist. Yet little use (and even meager appraisal in agricultural economic circles) has been made of less complex, single-equation production functions of the Cobb-Douglas category. (While the specific algebraic form of the Cobb-Douglas function was logarithmic, alternatives such as linear, quadratic and other functions can be applied in single-equation form.)

Simultaneous Equations

Realizations that the statistical model must be consistent with the economic (theoretical or subject matter) model, and also that

[10] The long-standing distinction between scientists as "theorists" and "applied" must be broken down if most efficient techniques are to be developed. (Every "applied" scientist must be a "theorist" to the extent of formulating productive hypotheses—unless he is simply to duplicate the studies of others or run the same study "over and over.") Otherwise the "theorist" will never understand the adaptations needed in general principles or techniques to meet the variations of a particular problem or set of data; and the "applied" worker may not know how to interpret his findings after they have been derived by "high-powered" techniques or how to "speak the language" to an extent that he is able to outline adaptations that can be made by the "pure scientist" alone.

a complete economic system rarely involves a single structural relationship, as well as the fact that certain of the assumptions underlying least squares analysis are not appropriate for economic observation, has led to the development by econometricians of the simultaneous equations approach in estimating economic relationships. Here a set of relationships rather than a single relationship is assumed among the observed variables. For purposes of estimation, variables are divided into categories of endogenous (those whose behavior is believed to be explained within the system or by the set of relationships) and exogenous (those believed to be determined outside the system or set of relationships). A random variable (called disturbances) is included for each relation where it is known (or assumed) that the specified model does not "fully explain" the relationships. The first step toward estimation is *model building* which involves the specification of a model or *complete set* of relationships which "explain the phenomenon." (In simple terms, the thinking through and designation of all variables that have bearing on the problem and the specification of their algebraic form.) Without further details on techniques the possible application of the approach in production economics research becomes evident. The study of a farm as a unit, or aggregates of production, immediately involves not one but many relationships. The same is true for producing units of other magnitudes. Finally, the development of models in the vein of the simultaneous equations approach is itself a useful exercise, perhaps even if the complex statistical machinery is never put in motion, in the sense that it requires the research worker to "think through" all the possible variables and relationships which may affect the magnitude of the coefficients which he is trying to estimate.

While we are not without "scientific reservation" towards some of these procedures, we are experimenting with the techniques and feel that the underlying logic is indeed sound. Theoretical and applied work in the area stands to extend the field of agricultural production economics. Even the use of conventional efficiency indices (labor income, management return to similar residuals) will be open to question until derivation of marginal productivities is possible. Certainly the simultaneous equation approach is logically appropriate in decision models whereby the behavior pattern of individual farm firms might be studied. Even after 40 years of farm management research we still have no data which adequately

"explains" the behavior of farmers relative to purchase and use of factors and the output and supply of products; for example, the tendency of farmers to maintain and increase output during depressions or to take on new techniques and additional capital in "great gobs" as in the 40's—even though many would have also been profitable in the '30's.

Factor and Product Relationships

We do not have space for discussing the application of certain of the most elementary concepts in production economics. Yet here the pace in applied work is even far behind the development of "proven" principle. Many of these relationships have great practical value and can be understood and actually applied by physical scientists. Mainly the concept of diminishing returns in the vein of a simple production function of one factor and one product has been employed to great extent. Equally as practical and simple in quantitative estimation are *iso-product contours* (or production surfaces) and *iso-revenue curves* (transformation functions). While both have application in broader production problems, the first can be derived by an animal husbandman in a feeding trial, while the second can be derived by an agronomist in a crop rotation experiment. Use of the models here is in the context of technology; however, production economists can avoid faulty logic in their "static" recommendations by employing the concepts in the manner of equating marginal rates of substitution of resources with the ratios of factor costs (in contrast to the implicit finding of many studies that farmers should use all machinery and no labor, or vice-versa, as shown by the rank of labor returns), and equating the marginal rates of substitution between enterprises with the ratio of commodity prices (in contrast to "labor income" studies which imply that farmers should go the limit either in specialization or diversification).

NEEDED DEVELOPMENTS IN ECONOMIC THEORY AS APPLIED TO FARM MANAGEMENT*

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THIS paper is built around four categories of economic theories each of which is defined in the first section. The second section deals with problems indicating needed developments in each category of theories. The third and final section deals with needed developments in the theories of each category.

Definitions of Theory Categories

The four categories of theories to be defined herein are: (1) static, (2) trend, (3) risk-trend, and (4) dynamic.[1] The definitions follow:

Static theories deal with precise relationships between variables. The relationships do not change through time—no probability distributions or trends are involved and perfect knowledge and foresight are assumed. To permit imperfect knowledge would introduce inexact, subjective relationships between variables which would be inconsistent with the specification of precise relationships.

Trend theories handle all problems dealt with by static theories and, in addition, problems arising from changes in relationships between variables which occur over time. No probability distributions are involved. Perfect knowledge and foresight of all economic variables and changes in relationships are assumed, otherwise subjective probability distributions would be introduced reflecting doubts in the mind of a poorly informed person.

Risk-trend theories deal with all problems handled by the first two categories and, in addition, inexact relationships between variables. Relationships but not probability distributions are permitted to change over time. Perfect knowledge and foresight—within the limits of the unchanging probability distributions—are assumed to

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[1] For other classifications of theories see: P. A. Samuelson, *Foundations of Economic Analysis*, (Cambridge: Harvard University Press, 1948), pp. 315–316, and T. C. Koopmans, *Statistical Inference in Dynamic Economic Models*, (New York: John Wiley & Sons, Inc., 1950), Chapter I.

prevent introduction of subjective probability distributions which would change as a result of the learning process. All individuals are assumed fully informed concerning the stable probability distributions.

Dynamic theories, as defined herein, handle problems arising from changing probability distributions as well as all of the problems handled by the first three categories. It is not necessary to assume perfect knowledge and foresight in dynamic theories, as subjective probability distributions which change with the learning process are permitted in the specifications for this category. The extreme case in which a probability distribution became so extensive as to be undefinable is included.[2]

Problems Indicating Further Developments in Economic Theory Needed for Farm Management Research

The following problems, indicating shortcomings in farm management's conceptual background, are classed under the theory categories defined above. Problems are placed under the simplest category of theories responsible for furnishing hypotheses concerning their solutions, hence are not arranged in order of importance.

Problems Indicating Needed Developments in Static Theories. One such problem arises in trying to use profit maximizing principles on production functions subject to physical limitations. The definite limits which exist on the proportions in which concentrates and roughage may be fed to dairy cattle illustrate this problem. Another restriction often encountered is the quantity of a home-produced input (including labor) available for an enterprise.

A second problem is that of estimating value productivity functions for different categories of resources such as working capital, livestock, machinery, etc.

The third problem is that of securing a simple means of making an economic choice between alternative production techniques or between alternative combinations of enterprises on multiple-product farms.[3]

[2] G. L. S. Shackle, *Expectations in Economics*, (Cambridge: Cambridge University Press, 1949), Chapter I contains a preliminary discussion of the importance of including undefinable probability distributions.

[3] Both of these related problems include, as subheads, (1) the problems of complementarity and substitutability among inputs, (2) the problems of competitiveness and supplementarity among products, (3) the problems of scale of enterprise and operations, and (4) cost of production problems.

The fourth problem is that of aggregating responses of individual farms.

Problems Indicating Needed Developments in Trend Theories. Though trend problems are difficult to handle, it is hard to isolate problems which are unsolvable because of shortcomings in trend theories. Difficulties in using trend theories arise largely from (1) conceptual problems held over from statics and (2) attempts to apply trend theories which assume precise relationships to problems involving inexact relationships.

Problems Indicating Needed Developments in Risk-Trend Theories. Problems involving formal insurance schemes are closely related to the informal insurance problems of diversification, maintenance of reserves against unfavorable contingencies, etc. Both formal and informal insurance are based on tacit assumptions of constant probability distributions—trends may or may not be involved.

Another set of problems concerns long run investment plans.

Problems Indicating Needed Developments in Dynamic Theories. The first two problems to be listed under the dynamic theories category are those of securing a clear-cut functional definition of management and of delimiting the bounds of farm management as a field of study.

The problem of securing a clear-cut conception of "returns to management" is the third to be listed in the dynamic category.

The fourth problem is that of deriving organizational principles for use in managing farms under conditions which permit a manager to learn more about technical processes and economic forces affecting his business.

The fifth problem, which is closely related to the fourth, is that of securing organizational principles for use in setting up and operating farms with limited resources.

The sixth problem is that of securing a clear-cut concept of the relationships between the home and business aspects of farms.

A seventh problem has to do with the effect on size of farm of removing price and yield fluctuations.

The eighth problem arises from the need for a more clear-cut formulation of the relationship between farmers (as managers) and their advisors.

As this incomplete enumeration of problems faced by our profession contains only those for which our theoretical background

appears weak, it is not an indictment of farm management workers by a theorist or by theorists in general. It comes nearer to being an indictment of theorists. Farm management is a developing science and today's purpose is that of ascertaining areas of economic theory which should be extended for the good of farm management as a science.

Needed Developments

This section will deal with needed developments in each of the above four theory categories.

Static Theories. In static theories, tacit assumptions usually fix production and utility functions as to both shape and number, and the behavior ascribed to producer and consumer units is generally plausible only within the assumption of perfect knowledge and foresight. With resources owners and product consumers assumed to have perfect knowledge of production and utility functions, managers are not needed to distribute resources and commodities properly. An interesting characteristic of theories falling into this category is the ease with which such theories permit the production aspects of a farm to be separated from the consumer aspects. In such theories, a "firm" can be defined as an economic unit concerned with production and motivated to maximize profits. And a "household" can be defined as an economic unit concerned with consumption and motivated to maximize utility. Another interesting characteristic is that these theories do not specify an optimum size of firm in a length of run long enough to make all inputs variable.

Static theory has a very useful place in farm management research, but the applications in our science have not been fully worked out. The question to be considered now is: What developments or adaptations are needed in static theory to make it more applicable in farm management?

Production function theory assumes a range of inputs from zero to a quantity sufficiently large to yield negative marginal returns. But, in the real world, physical restrictions often exist on the use of inputs. For example, three such restrictions exist on a production function representing the annual relationship between milk output per cow, concentrate input, and roughage input. The first of these is the "maintenance line," the second is the "stomach limit," and the third is some sort of a "concentrate limit line" representing

the maximum proportion of concentrates which can be incorporated into a cow's ration without making her ill. At the intersection of the scale line and a boundary restriction, the economic problem is one of choosing among nonrestricted alternatives no one of which may correspond to any of the optima defined by ordinary economic principles. To the writer's knowledge, the economics of such choices among nonrestricted alternatives has not been worked out for the problems peculiar to agricultural production.[4]

Earlier in this paper, the problem of estimating value productivity functions for different categories of resources was noted.[5] Many assumptions have to be made concerning the various inputs which are lumped together into a category. The proportions in which the inputs making up a resource category are combined affect the productivity of the category. The logical, nonarbitrary procedure is to combine inputs according to the proportions dictated by the scale line. But the scale line depends on relative prices and the function relating specific inputs to outputs. Thus, investigators tend to use data gathered from firms operating at one point in time, hence at one set of relative prices. This procedure defines a definite scale line. But a point in time is a very short run and, unless the resource category is carefully defined, many of its components are fixed. Are the fixed inputs fixed by chance or past prices in the proportions dictated by the scale line? Another similar group of assumptions which are necessary if more than one product is produced has to do with combinations of enterprises. Truly, the theory behind estimates of value productivity functions for categories of resources employed in producing more than one product is cumbersome.

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[4] It is possible for the most desirable action to *appear* to be (but not really be) contrary to accepted economic principles, i.e., the economic choice between nonrestricted alternatives appears, in some cases, to turn on equalizing average rather than marginal quantities.

[5] Both agricultural and general economists have been concerned with this problem. Senator Paul Douglas conducted years of research investigating the value productivity of labor and capital in different industries and in different countries. And Earl Heady has attempted to estimate value productivity functions for a random sample of Iowa farms. M. Bronfenbrenner has pointed out the danger that estimates of value productivity functions may be hybrids between value productivity functions for a given kind of firm and an integrated demand curve of the industry for the input. See Paul Douglas, "Are There Laws of Production?" *The American Economic Review*, XXXVIII (1948) 1. Also see Earl O. Heady, "Production Functions from a Random Sample of Farms," this *Journal*, XXVIII (1946), 989; and M. Bronfenbrenner, "Production Functions: Cobb-Douglas, Interfirm, Intrafirm," *Econometrica*, XII (1944), 35.

An input for a given product may be *procured* in two ways: (1) it may be produced on the farm where used or (2) it may be purchased. Transportation and processing costs often result in major differences between the value of a home-produced input and the same input purchased. This consideration is especially important in handling roughage and labor utilization problems. A budgeter using average requirements worries very little about which price to use. A budgeter using input-output relationships, however, does worry as prices affect the amount of an input which he uses. These price differences also cause discontinuities in short run cost functions. Where is the literature which works out the detailed conceptual background for this type of problem? Perhaps such problems should be handled with the risk-trend or dynamic theories, as the manager is not always certain he will run out of the home-produced input. This is especially true for farms which purchase occasionally in areas usually producing a surplus of the input. Though this is not a difficult theoretical problem it has not been specifically worked out.

Farm management men are often asked "What is the most economical way to produce such and such a product?" In some cases the answer is easy. In others, it is difficult, depending on small differences in relative prices of inputs and on small differences between production functions. Empiricists attempting to solve such problems by budgeting alternative methods of production are often overwhelmed by the number of computations required. When competitive conditions are assumed in a run long enough to bring about equality among average value productivity, marginal value productivity, and marginal factor cost, the lengths of runs required to attain competitive adjustment are often long enough to make additional inputs variable, hence add additional dimensions to the production functions. When competitive conditions are assumed in a length of run long enough for each variable input to be used so as to equalize its marginal value product with its marginal cost, the determinate conceptual answer secured is somewhat more readily usable.[6] Similar theoretical solutions are

[6] For some partial applications of this nature, see E. Jensen, *et. al.*, *Input-Output Relationships in Milk Production*, U. S. Department of Agriculture Tech. Bul. 815; L. Jay Atkinson and John W. Klein, *Feed Consumption and the Production of Pork and Lard*, U. S. Department of Agriculture Tech. Bul. 917; A. G. Nelson, *Relation of Feed Consumed to Food Products Produced by Fattening Cattle*, U. S. Department of Agriculture Tech. Bul. 900.

secured through the use of transformation functions and iso-revenue curves relating to two products. One difficulty with such "contour" concepts is the fact that they are limited to problems involving two inputs or two products. Persons attempting to use the contour concepts in research on problems involving the production of two products do not avoid the difficult task of estimating scale lines on two production functions under specified lengths of run. If this problem is by-passed in such studies, they remain theoretical skeletons incapable of being fattened by empirical work.[7] More will be said concerning estimates of production functions in connection with the next problem.

A closely related group of problems involves costs of production in the short and intermediate lengths of run. In Kentucky, the speaker and others are sometimes questioned concerning the cost of producing milk when "milking parlor" sheds are added to existing tobacco barns. Average variable costs and marginal costs in this case must be related to a definite length of run in which certain specified inputs are variable. The relevant production functions and consequent cost functions for milk in this length of run must deal with a much wider range of inputs than covered by the partial function underlying bulletin 815 on input-output relationships in milk production. Persons constructing conceptual backgrounds for studies of particular enterprises or combinations of enterprises in a particular length of run have not always selected variable inputs which correspond with the length of run under consideration. Neither have persons making cost of production computations without benefit of systematic theory. Development of clear-cut concepts of production functions for pertinent lengths is a painstaking task. It involves the humdrum of carefully working out N-dimensional details of subportions of general production functions involving more than N-dimensions. A different subportion of a general function is needed for each length of run. Each subportion of a general function has a unique scale line for every possible set of relative prices. And each scale line has associated with it a unique set of cost functions. Thus, the number of cost

[7] Consider the problem of doing empirical work to accompany Heady's work on the theory of rotations and on uncertainty in market relationships and resource allocation without estimating scale lines on precisely defined production functions. See Earl O. Heady, "The Economics of Rotations with Farm and Production Policy Applications," this *Journal* XXX (1948), 645 and "Uncertainty in Market Relationships and Resource Allocation in the Short-Run," this *Journal* XXXII (1950), 240.

functions derivable from a general production function is at least "infinity to the second power times four"; hence, it behooves us to pick out and specifically identify the pertinent ones![8] Conceptual simplification would be tremendously helpful. Resort to traditional budgeting and cost accounting procedures at this point does not appear to offer an out. These two types of farm management research have resulted in much confusion between length of runs and, simultaneously, between fixed and variable costs. Inconsistent assumptions are often made in such computations to simplify work.

The problem of joint costs has not been mentioned specifically. It appears that strict specification of appropriate production functions and lengths of run will eliminate certain problems of joint costs. In other cases, determinate conceptual answers do not appear to exist; hence, arbitrary computations must be made or the problems correctly regarded as unsolvable.

Two current pieces of research are worthwhile noting in connection with the above problems because they suggest simplified procedures. Milton Friedman's work on planning experiments seeking maxima[9] indirectly suggests methods which might be adapted by budgeters to increase the speed at which the budgeting process converges on a point of maximum profit. The other piece of research is the work being done in the Cowles Commission on "linear programming." Roughly, linear programming is a system of economics which often approximates curvilinear surfaces with a series of individually defined plane surfaces. This simplifying approach makes it possible to separate production into activities, the most favorable of which can be linearly expanded until a basic resource limitation is encountered. Beyond this limitation less favorable activities are expanded. In effect, an optimum budget

[8] The preceding discussion of production functions logically involves subquestions concerning scale of enterprise, scale of operations for multiple product farms, substitutability and complementarity among inputs and supplementarity and competitiveness among products. N. Kaldor, in "The Equilibrium of the Firm," *The Economic Journal*, XLIV (1944) pp. 60 ff., points out that static theory does not determine the size of a firm short of one firm per industry in the ultimate long run in which all inputs are variable and in which, as a consequence, (1) no problems of proportionality arise and (2) constant returns to scale exist. The questions asked by the empirical researcher are these: Does any length of run exist in which all inputs are variable? Are not inputs fixed, worn out, and replaced in a continuous sequence which always results in fixed inputs? Even a new business encounters certain fixed or limited community assets such as roads, railroads, etc.

[9] C. Eisenhart, *et al.*, *Techniques of Statistical Analysis*, (New York: McGraw-Hill Book Company, 1947), 363.

is selected. The mathematics of linear programming is involved; the computations are long; however, linear programming promises to be adaptable for use in modern electronic computing devices. Hence, the end result may turn out to be a more complicated theory but reduced manual computations. In any event these comments on linear programming are somewhat speculative.

The problem of aggregating responses of individual farmers into area, region, and industry-wide responses is a vexing one. In dealing with an individual, competitive firm, input and product prices can usually be assumed fixed by factors external to the firm. In aggregative problems, however, the process of price and output determination is one of mutual or joint determination; if this is so, it is clear that until a statistical process of fitting can be used which takes into account this aspect of theory, much of existing economic theory has to be disregarded or improperly used.[10] Processes are now partially developed which permit a fuller use of theory in connection with such studies. These processes involve a set of principles which formalize and extend those followed by "common sense" researchers dealing with input-output relationships, etc. These principles involve (1) specification of economic relationships among mutually dependent and independent variables, (2) tests for completeness of the specifications, (3) tests for consistency of the specifications, (4) a procedure for solving the relationships to secure equations which express dependent variables as a function of independent variables only, (5) fitting of the equations expressing the dependent variables as functions of independent variables,[11] and (6) the conversion of coefficients for the fitted equations back into coefficients for the specified relationships. This procedure employs economic, statistical, and mathematical theory jointly and is known as econometrics. It is easy in individual firm or enterprise problems but difficult in aggregative problems for common sense to insure compliance with these rules. Therefore, a special need exists for theory which gives special attention to (1) mutual relationships between prices and quantities used, produced, or sold, (2) the independence and dependence of variables, and (3) variables whose influence can be

[10] George M. Kuznets, "The Use of Econometric Models in Agricultural Micro-Economic Studies," this *Journal*, XXX (1948), 136.

[11] Fitting is often done by ordinary single equation, least squares processes.

relegated to the probability distribution limbus of unexplained, random residuals.

Trend Theories.[12] In trend theories assumptions are relaxed which (1) fix the magnitude of variables and (2) fix the relationships between them. These assumptions are replaced by those which permit magnitudes and relationships to change in an exact, perfectly known, and perfectly foreseen way. No probability distributions are permitted to exist—not even of doubts in the minds of individuals. Hence, perfect knowledge and foresight must be assumed.

Trend theories trace out paths over which changes are made. Darryl R. Francis' and Donald L. Henry's report evaluating farm and home development programs[13] illustrates the use of trend analysis by analyzing the effects over time of introducing a series of investment changes in a farm business.

The theories of the risk-trend category are adapted to such area-wide studies as (1) the impact of technological changes on interregional comparative advantages and (2) the effect of adjustment programs. This paper will not place heavy emphasis on needed developments in trend theories. As trend theories are an extension of static theories, the shortcomings of static theories are also shortcomings of trend theories. Clarification, simplification, and adherence in the use of trend theories to situations in which they are applicable are sorely needed. If this last specification were held to, the amount of research work employing this type of theory at the individual farm level would not be great.

Risk-Trend Theories. In risk-trend theories, assumptions which assure unchanging, exact production and utility functions are relaxed and replaced by assumptions which permit (1) trends in relationships between variables (2) trends in the magnitude of

[12] General agricultural economics provides some excellent examples of studies employing this category of theory, i.e., Book IV of John Stuart Mill's *Principles of Political Economy* and. T. W. Schultz' *Agriculture in an Unstable Economy* provide examples of cases in which shifting relationships between input and output, between population and overall demand, etc., have been carefully examined. See T. W. Schultz, *Agriculture in an Unstable Economy.* (New York; McGraw-Hill, 1945), 44, dealing with (1) unequal growth of the supply and demand for farm products and (2) unequal rates of growth with supply of farm products ahead of demand.

[13] Darryl R. Francis and Donald L. Henry, *Evaluation of Farm and Home Development Programs,* (St. Louis: Federal Reserve Bank of St. Louis, 1949). Also, see Carl P. Heisig, "Income Stability in High-Risk Farming Areas," this *Journal,* XXVIII (1946), 961.

variables and (3) changes in relationships which are random within *exact* probability distributions. In such systems, production plans are made on the basis of (1) expected prices, yields, and costs and (2) possible deviations of such variables from expected values.

Thought concerning such theories brings problems of contractual and informal insurance to mind, as well as production and investment problems.

Contractual insurance, of course, refers to contract insurance between an insurance company and an insuree, while informal insurance refers to such self insurance schemes as diversification, hedging and maintenance of reserves against anticipated losses, etc. The welfare aspects of subsidized formal insurance schemes need to be further developed conceptually to serve as a background for empirical work aimed at evaluation of such schemes.[14] Farm managers have long had a close interest in the organizational principles of diversification, maintenance of reserves, hedging, etc. Recently, D. Gale Johnson, Harold Halcrow, and others have done empirical research on how price and yield variations affect farm income.[15] One of the main difficulties confronting researchers in this area is that of finding empirical probability distributions; i.e., the main difficulty is empirical, not theoretical. Schickele, in his paper on farm business survival under extreme weather risks, noted that the shortage of probability distributions for weather and yields handicaps the work of persons trying to devise contractual and informal insurance schemes to aid Great Plains farmers.[16] When reliable estimates of probability distributions are available, the introduction of risk discounts and premiums into static theory nearly converts static theory into risk theory. However, risk premiums and discounts are determined by the supply of and demand for risk-bearing services. Even with unchanging probability distributions, the demand for risk-bearing services (including informal self insurance schemes) is subjectively determined.[17] Thus, subjective values (i.e., wants and preferences)

[14] Harold G. Halcrow, "Actuarial Structures for Crop Insurance," this *Journal*, XXXI (1949), pp. 419–420. "A strong case may be presented for compulsory crop insurance or for insurance involving subsidy."

[15] D. Gale Johnson, *Forward Prices for Agriculture*, (Chicago: The University of Chicago Press, 1947), pp. 48 ff. Halcrow, *op. cit.*, 418.

[16] Rainer Schickele, "Farm Business Survival Under Extreme Weather Risks," this *Journal* XXXI (1949), 931.

[17] Halcrow, *op. cit.*, 419, "The failure to attract participation of the majority of farmers suggests that many farmers have not looked with favor on the premium indemnity schedule. . . . "

are introduced into the business or production end of theory. Long-run production and investment problems are often investigated within the conceptual framework of risk-trend theories. Such problems involve discounting of future returns, and appropriate discount rates depend, in turn, upon subjective considerations. Also, certain current farm problems seem to arise from differences between subjective values of farmers and values held by members of public policy forming groups. Thus, a difference in the rate at which farmers (as individuals) and policy formers discount the future seems to be a fundamental aspect of the soil conservation problem. The question of subjective values will be examined in much more detail in connection with dynamic theories.

Dynamic Theories. Theories in the risk-trend category just examined relaxed the assumptions which assure constant, exact production and utility functions. Relaxation of these assumptions made future prices and yields indefinite. Production plans, in turn, had to be based on (1) anticipated prices and yields, and on (2) probability distributions concerning the anticipated prices and yields. Dynamic theories as defined herein permit the probability distributions themselves to change. This makes it possible to include states of ignorance concerning future events. An imperfectly informed person necessarily has doubts in his mind concerning any estimate which he makes of a future event. These doubts constitute a subjective probability distribution. As a person learns, the doubts are reduced and/or changed and his subjective probability distribution of doubts changes. Introduction of planning on the basis of improving knowledge, as well as on the basis of risk, forces theories in the dynamic category to handle (1) the learning process, (2) maintenance of flexibility to permit readjustment to improved knowledge, and (3) the value of following keen observing ability, aids to the learning process, ability to learn, and accuracy.[18]

Efficient learners are able to handle the affairs of their businesses more accurately and quickly than inefficient learners. Efficient learners are close observers, keen analysts, and adept decision makers. Managers (as learners) observe, analyze, and decide. If the functions of (1) acting on the basis of conclusions and (2) bearing the economic consequences of those actions are added to these three functions, *five of management's functions are observation,*

[18] A related means of reducing doubts concerning an estimate of a future event takes advantage of serial correlations among economic variables.

analysis, decision-making, action, and acceptance of economic responsibility. This functional definition of management appears good but is still undeveloped with respect to the relationships between the learning process and management. What are the principles a manager should follow in order to maximize his efficiency as an observer? as an analyst? How are the marginal costs of observations and analysis equated with their marginal value productivities? How does one differentiate conceptually between various degrees of technical skill and managerial ability?

Both inductive and deductive techniques are important in the learning process. Many of the thought processes employed by farm managers are inductive—this is especially true of thought concerning future events. Statistical theory provides formal techniques for estimating and for choosing between alternative hypotheses concerning future events. Recently, multi-sampling techniques evolved into sequential sampling methods for choosing between alternative hypotheses.[19] Sequential sampling is a method of sampling continuously until enough information is accumulated to permit a sufficiently accurate choice between alternative hypotheses.

This sounds involved, but formal statistical techniques approximate only a small part of the complicated thought processes actually employed by managers. Prior to the development of sequential analysis, formal statistical theory did not contain the equivalent of the thought processes employed by the manager who says "I'll wait around until I find out whether this looks good before I make up my mind." Such a manager is making a sequential choice between two hypotheses; the first is: the situation is favorable enough for me to act; and the second is: the situation is not favorable enough for me to act.[20] Thus, sequential sampling theory approximates an actual thought process. Integration of sequential analysis with the dynamic theory of the firm promises

[19] A. Wald, "Sequential Tests of Statistical Hypotheses," *Annals of Mathematical Statistics*, XVI (1945), 117 and A. Wald, *Sequential Analysis*, New York: John Wiley & Sons, Inc., 1947. Because information concerning the order in which observations occur as well as information concerning the magnitude of the observations is utilized, sequential sampling is more efficient than single sampling.

[20] A. Wald, "Sequential Methods of Sampling for Deciding Between Two Alternative Courses of Action," *Journal of the American Statistical Association*, XL (1945), 277. Also see G. L. S. Shackle, *Expectations in Economics*, (Cambridge: Cambridge University Press, 1949) for support of the idea that managers choose between two hypotheses one of which deals with a favorable outcome and the other of which deals with an unfavorable outcome.

to be useful in farm management research.[21] As statistical theory expands, additional everyday thought processes will probably be approximated by formal statistical theories. Each such expansion offers an opportunity to integrate inductive thought processes into the theory of management.

All thought processes are subject to errors. Some managers are at once quicker and more accurate in their conclusions than others. As it takes time for a manager to reason deductively, make observations, analyze observations, and draw inductive conclusions, inefficient learners among managers require more time to make business decisions with a given degree of accuracy than efficient learners. Time for thinking and decision making is often purchased with resources held in reserve or in inefficient uses. Net returns to a business, therefore, depend upon the ability of its manager to learn effectively and rapidly. Differences in net income due to variations in learning ability are conceptually traceable to management.

The discussion of returns to management is not complete at this point. Some managers gamble; others are conservative. Overly conservative managers may never get into business and, if they do, may never be able to learn enough about a future event to permit them to act. Over-conservatism may require more accuracy than is economically attainable. The result is that more audacious managers may beat more conservative managers to lucrative opportunities. On the other hand, the gambler may continually try to exploit opportunities about which he is poorly informed. Though the gambler worries little about committing errors of logic and statistical inference, the results of such errors may "wipe him out." There seems to be an optimum degree of risk taking. A little reflection indicates that the amount of risk a manager is willing to run depends upon such factors as (1) the amount of assets he has to lose, (2) the status of his family, (3) his age, (4) the society in which he lives, (5) the effect of possible gains or losses upon social position, and (6) love of adventure. As economists in public employ, academic farm managers tend to be "security seekers." They tend

[21] G. L. Johnson, *Allocative Efficiency of Agricultural Prices—as Affected by the General Level of Employment*, unpublished doctoral dissertation, University of Chicago, 1949. See Chapter II for a discussion of sequential analysis and the theory of the firm. Also see Jacob Marschak, "The Role of Liquidity Under Complete and Incomplete Information," *American Economic Review*, XXXIX (1949), pp. 182–195 for a mathematical treatment of liquidity including some attention to the relationship between liquidity and sequential analysis.

to regard doubtful outcomes as undesirable, doleful things, and forget the joys of pleasant surprise. The joy of surprise is an important source of motivation for actual managers, and should be a part of farm management's conceptual background.[22] It is evident that the risk a manager will run depends in part upon the utility which he derives from changes in income.[23] And it is obvious that the net returns of a business depend upon this tendency to run risks. Conceptually, it is not clear whether changes in net income which depend indirectly upon a manager's income utility function should be included in returns to management. Windfall profits and losses are often important components of a farm's net income. How are windfall profits and losses excluded from returns to management? One way to do this at the conceptual level is to define a windfall gain as the result of an error in inference which results in a resource being employed to earn more than cost and to define a windfall loss as the result of an error in inference which results in a resource being employed to earn less than cost. This discussion of returns to management, the utility of changes in income, windfall profits and windfall losses is not intended to be conclusive; it is intended to indicate needed developments in theory.

The necessity of purchasing time for learning in the business world at the cost of idle or reserve resources was noted a moment ago. Flexibility as an organizational principle can be defined as an allocation of resources which permits reallocation after the future has been made clear through the learning process and/or serial correlation among economic variables.[24] Flexibility, thus defined, gives the manager (1) time to learn and observe serial correlations and (2) the ability to readjust. Heady's work on the theory of uncertainty in market relationships examines the problem of building flexibility into long run investments so as to permit readjustment to short run changes in market prices.[25] Flexibility or-

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[22] G. L. S. Shackle, *Expectations in Economics*, (Cambridge: Cambridge University Press, 1949).

[23] M. Friedman and L. J. Savage, "The Utility Analysis of Choices Involving Risk," *Journal of Political Economy*, LVI (1948), 279.

[24] G. L. Johnson, *Allocative Efficiency of Agricultural Prices as Affected by Changes in the General Level of Employment*, Unpublished doctoral dissertation, University of Chicago, 1949, see Chapter II for discussion of windfall profits, losses, and flexibility.

[25] Earl O. Heady, "Uncertainty in Market Relationships and Resource Allocation in the Short-Run," this *Journal*, XXXII (1950), 240.

dinarily has a cost to offset the value derived from the time it grants a manager to learn, observe serial correlation, and change his business organization. Farm organizational principles dealing with flexibility must deal with the cost and value of flexibility. The difficult aspect is that the cost and value of flexibility are often subjective. Farm management researchers studying this area of management cannot remain realistic and avoid the subjective. Wants and preferences exist as an integral part of management and must be studied if managerial actions are to be understood.[26] This applies to aggregative problems as well as to problems of individual farms.

The influence of limited cash and credit assets has been studied at Iowa under the general term of capital rationing and largely with risk-trend theories. More work needs to be done on cash and credit reserves conceived as forms of flexibility instead of as informal insurance schemes.

Further developments of the theory being considered at this point would materially improve the conceptual background for studies of small farms with their limited asset problems and investment-consumption conflicts.

In addition to the subjective elements in the managerial functions, persons who have watched a farm manager enjoy such assets as a new red tractor, know that a great deal of consumption occurs on the business side of farming. And those of you who have watched a farm woman at work know that her household produces real income. In dynamic theory, lines of demarcation between the firm and household become vague and somewhat arbitrary, and farm management techniques which budget and plan the business aspects of the farm without reference to the household are unrealistic. The extension men working on farm and home development programs need research based on the realistic conceptual background which can be provided by further development of dynamic theories.

Kaldor has indicated that a competitive size of firm is not determined by static theory in a run long enough to permit all inputs to be variable, i.e., decreasing returns and increasing costs would not develop. In the dynamic theories under consideration here,

[26] It should not be forgotten that subjective matters can be handled objectively; i.e., an objective architect takes the subjective wants and preferences of clients into account in designing homes.

management tends to be the factor which limits firms to competitive sizes. Also, in these theories, one of management's functions is that of learning about noncertain future events. The question posed is: Would schemes devised to reduce price and yield variations reduce the importance of management and increase the size of commercial farming operations?[27]

The theory examined thus far has yielded an incomplete concept of management which has certain implications concerning the relationships between farmers as managers and their advisors. If the tasks of a manager are to observe, analyze, conclude, act, and bear responsibility for actions, the conclusions of a farmer depend upon his responsibilities and upon various subjective considerations. The theory indicates than an advisor can be of most assistance to an actual farm manager in the two steps of observing and analyzing; i.e., the professional farm manager can teach actual farm managers to be more efficient observers and analysts, he can increase the rate at which technical and economic information becomes available to them, and he can help them see consequences of errors. It appears that further developments in theory which integrate the learning and managerial processes would contribute useful hypotheses for studying extension techniques.

DISCUSSION

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Dr. Glenn Johnson neatly classifies economic theories (risk, trend, risk-trend, dynamic) and then sub-classifies problems that they might aid in solving. As this classification is new to the literature of agricultural economists, I think it will be well worth remembering as an aid in bringing order to our kit of economic tools.

I can report experience with a project which gives application to a problem of static and non-static models, sampling theory and new statistical techniques that Fellows, James, Heady, and Johnson have been discussing.

Our problem was that of determining the returns to scale of operations (on cash-grain farms) and thus put empirical fact in the place of the myths, fallacies, and beliefs about returns to farm size. Answers to popular questions were sought, such as: Is the small farmer being squeezed out? Can he compete with the large-scale operator? Are there economies to scale of operations in agriculture?

[27] Robert W. Rudd and David L. MacFarlane, "The Scale of Operations in Agriculture," this *Journal*, XXIV (1942), 420 and D. Gale Johnson, *Forward Prices for Agriculture*, (Chicago: University of Chicago Press, 1947), pp. 69–70.

The respondents gave us first a costs and returns record; on the second visit, they gave us subjective information concerning dynamic situations. In the latter we were interested in their responses to risk and uncertainty, capital rationing, increasing risk with various equity positions, expectations, and other information concerning the decision-making process. The specific models used were the flexible and inflexible cost curves, popularized by Stigler to show the cost of uncertainty and risk in the firm; different marginal productivity curves for a firm with access to (1) adequate capital and (2) lack of capital enables us to show the costs of capital rationing; and a similar model aids us in determining the effects of increasing risk with decreasing equity.

From a general decision model, a working model with fewer variables (which could be obtained from the data) was formulated. Parameters for the production function in the model were calculated as well as for other relationships in the system. These parameters yielded us answers to the nature of returns to scale, the optimum farm size, the elasticity and marginal productivity of the resources used. The holding of some variables at their means and other levels, or the use of simpler equations, enabled us to derive the cost and production functions that Mr. Fellows spoke of yesterday, i.e., short run cost curves, long run planning curves, iso-cost curves, and production functions. The functions are in numerous arithmetic and logarithmic forms, curvilinear and otherwise, and are derived by the use of both the single equation multiple regression approach and simultaneous (multiple) equation approach. The results are compared to determine the most efficient method of deriving the relationship wanted.

The simultaneous equation approach is the most logical from an economic standpoint, for it recognizes the interdependence of the variables and it follows logically from our decision model; but when large numbers of variables are involved, it is time-consuming and difficult. The traditional single-equation approach will yield estimates of parameters easily and quickly, but these estimates may be biased. In this study some parameters were noticeably different in magnitude, and in some cases, opposite in direction to that expected by one's intuition and the simultaneous equation results.

With caution, the results obtained should be useful in providing us with a first approximation of the optimum size and the nature of returns to scale of operations. Our conclusion as to needed shifts in resource use was not significantly changed by the answers obtained by the different statistical methods used.

The foregoing analysis is largely static in character and still leaves numerous questions unanswered regarding optimum size of firm under different levels of managerial ability, under different asset structures and under uncertainty, etc. As these dynamic considerations are the real crux of management, the aforementioned determinations are only a bench mark representing the adaptation of firms to their environment.

The information on the dynamic questionnaire enables us to cast some light on the decision-making process—how decisions are made and how resource use is affected by certain phenomena, particularly uncertainty. We

have been able to rank the relative importance of the many other factors that enter into resource use decisions that are ordinarily ignored, i.e., labor problems, household-firm considerations, age, and sociological relationships.

As considerations like uncertainty are rather intangible, just as is "utility," the idea embodied in the indifference curve approach was used,—that is, ordinal comparisons which assume that the entrepreneur can rank alternatives as to which would give the same, higher, or lower satisfactions. (Presumably he would be indifferent as to which situation he occupied if the same satisfaction resulted.)

The questions were formulated so that answers had to be given in objective criteria, i.e., acres, dollars, etc., enabling us to obtain quantitative answers of the effects of weather and price risks and uncertainties, capital rationing, equity position, and tenure. The same subjective (or attitude) approach gave us estimates concerning the optimum farm size under uncertainty, under different levels of managerial ability, the technical optimum, etc.

The answers concerning the optimum farm size and return to scale substantiate the costs and returns analysis. This may be due to coincidence or the fact that the firms have built into their cost structure the effects of uncertainty as are postulated by our theories of flexibility mentioned and extended by Johnson.

Certainly the attitude approach is not without criticism, but it is gaining respectability in dealing with expectation and uncertainty models.

From this analysis it is felt that we are now on safer ground in advocating farm plans, policies, and programs that are concerned with scale of operations and optimum resource use. This study can be used now as a first step in farm and home planning. Budgeting farm plans, while very useful in choosing alternatives, needs base studies to indicate the approximate relationships of costs and returns, and the effects of the dynamic considerations that make a situation determinant. We cannot specify an optimum under budgeting until we know the magnitude of the effects of dynamic factors.

The problem here utilized some of the theoretical models postulated by Mr. Fellows yesterday and by Dr. Heady today. The study suffers from a lack of knowledge about the management function concerning which Dr. Johnson has presented his own thinking and further needed analysis.

In my opinion we've got to put much emphasis on the role of management and the decision-making process. Much of our work is futile unless we can make our recommendations in terms of the entrepreneur's ability and his psychological make-up. The latter is strongly affected by his capital position. I do not want to depreciate the value of static models, but I do wish to emphasize that inferences from such studies must be put in a dynamic framework—the entrepreneur has to use them in that setting.

RELATION OF ECONOMIC THEORY TO THE ANALYSIS OF EMPIRICAL DATA IN FARM MANAGEMENT RESEARCH*

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Introduction

PRIMARY emphasis in this paper will be given to the relationship of economic theory and farm management research at the level of individual farms. A better understanding of the relation of theory to the analysis of empirical data at this level may also contribute to a clearer grasp of the function of economic theory in farm management research at area, regional, and national levels.

The older question of whether there is any relation between economic theory and research in farm management has been about settled. In a broad perspective it was part of the larger controversy between economists whose primary interests lay in analyzing empirical data and those whose interests were of a theoretical nature. In this process economic theory has undergone considerable reorientation. Basic assumptions have been clarified and given emphasis. Claims that economic theory is a description of the general tendency of our economic system have been replaced by the concept of economic theory as a body of hypotheses logically following from their assumptions which are useful in analyzing economic phenomena. The focus of the analysis has shifted from the industry to the firm, and a separation between the theory of the firm and the theory of external interrelations has been found useful.

Concurrently in studies analyzing empirical data the feeling has grown that "raw facts are, as such, a meaningless jumble."[1] The mere observation of associations is not enough. Application of research results requires that such associations reflect cause-effect relationships. Early studies in farm management, for example, placed the emphasis on the collection of facts about the relationship

* C. W. Crickman and Robert Glasgow have made helpful suggestions in the preparation of this paper. Also helpful was an unpublished paper by W. W. McPherson entitled "A Consideration of the Goals and Character of Farm Management Research" presented at the meetings of Southern Farm Management Research Committee, Nov. 21–25, 1949.

[1] Joseph Schumpeter, *Business Cycles*, Vol. I, p. 31.

of farm earnings to farm characteristics and practices. But seldom did such simple cross classifications and correlations clearly separate cause-effect relations. Only insofar as they reflected the cause-effect relations could these associations be developed into principles or recommendations.

Research analyzing empirical data no longer pretends to be purely empirical in the narrow sense that it is content with mere observation of existing associations. Further, a need is felt for the supplementation of common sense theories with a more powerful weapon to assist in the collection of facts and the attack on cause-effect relations. The real question becomes: How should economic theory be used in analyzing empirical data in farm management?

Nature of Present Day Farm Management and Economic Theory[2]

Some progress can be made in determining the relationships between economic theory and farm management research by clarifying our concepts. First, in regard to "facts" and "theory"—facts refer to events that have occurred. Theory deals with cause-effect relationships that (under the conditions specified) give rise to events of facts. The function of theory is to explain why. "The real issue lies not between facts vs. theory but between assumptions and facts to which theory is applied."[3] Pure theory is necessarily abstract to give precision to analytical tools and to the explanation of the cause-effect relations, and it may assume conditions that are unrealistic. But the techniques developed can be applied to realistic situations.

In this context it is useful to compare the nature of farm management and economic theory. The objectives of farm management have recently been stated as follows:

"Farm management research relates to the study of the economic efficiency and productivity of farm resources. Its specific objectives are (1) to guide individual farmers in the best use of their resources and in a manner compatible with the welfare of society, and (2) to provide a fundamental analysis of the efficiency of farm resource combinations which can

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[2] Major emphasis is given to static economic theory and the central core of farm management that deals with the adjustment to assumed "normal" price situations.

[3] W. W. McPherson, *op. cit.*, page 9. The viewpoint expressed here is developed in more detail in McPherson's paper.

serve as a basis for bettering public administration where agricultural policy or institutions which condition production efficiency are concerned."[4]

These objectives, like older definitions, imply that farmers are operating at varying levels of efficiency and that many farmers could raise their efficiency and incomes by making adjustments on their farm organization and operations. These elements of inefficiency in agriculture are our primary "problem" as research workers in farm management. Not only is it a problem at any one period of time, but the dynamic nature of our economy and the broad stream of new techniques brings up new problems of adjustment. An efficiently operated farm in one generation is likely to be highly inefficient in the next.

The theory of the firm is based on the general proposition that given: (1) the desire to maximize revenues, (2) homogeneous resources, and (3) optimum techniques, certain general results can be expected with: (a) variations in the quantities of variable inputs, (b) variations in quantities of products, and (c) variations in scale. With the appropriate technical information and knowledge of price-cost relations the most efficient organizations can be determined. The action of individual firms in seeking to maximize revenues together with the action of individual households seeking to maximize satisfaction results in the external relationships among firms. Effects of changes in prices on production and the supply and demand for the commodities produced and the factors employed can be analyzed. But such analyses require additional assumptions regarding the nature of competition and the mobility of resources.

Stated in this fashion there is an evident parallel between economic theory and farm management research. Both begin by analyzing adjustments to maximize efficiency on individual firms. Both study the implications of the adjustments on individual firms, on groups of firms, and on the economy as a whole.

But, while economic theory is interested in the development of techniques and underlying relationships, the object of farm management is to utilize these techniques and underlying relationships to develop propositions which will help to solve problems faced by individual farms or groups of farms. Further, farm management

[4] Earl O. Heady, "Elementary Models in Farm Production Economics Research," this *Journal*, May 1948, p. 205.

workers in studying conditions in agriculture find a great range in levels of production efficiency resulting largely from the effects of dynamic changes in technology and product prices. They place their major emphasis on the *exploration* of the *paths* of adjustment to an "equilibrium" position which will utilize resources more efficiently and will increase the returns to the individual farmer.

The major difference arises because of the simplifying assumptions used in economic theory. Due to constant change in the technological horizon and the resulting differences in such things as extent of knowledge and levels of technology employed, as well as differences in land resources, management abilities and sometimes the desire to maximize profits, the farm management analysis must replace the simple assumptions of economic theory with the conditions that exist.

Usefulness of the Theory of the Firm

The definitions, concepts, and analytical tools outlined in the theory of the firm provide a framework of logic for specifying conditions and assisting farm management analysis. It can be used to test the logical significance of observed relations. More important, by enabling the research worker to visualize in advance the underlying cause-effect relationships, it assists in the selection of relevant facts for analysis.

In the *comparative method* of farm management research the relationship of farm earnings to farm characteristics and farm practices are compared. This method is often thought of as being purely empirical or at least relatively independent of theory. Actually a theory with basic assumptions often is involved in the development of conclusions. The principles derived with this method can be accepted as valid if: (1) The conditions assumed in the general theory of the firm regarding homogeneity of land and management resources and the desire for profit maximization actually exists, and (2) if the variations in size, techniques, combinations in enterprises, and quantities of inputs are independent or can be separated.

The familiar problem of size of farm can be used to illustrate some of the difficulties in deriving conclusions by simply comparing the variation in results among farms. Indications that large farms make higher incomes can be translated into a valid recommendation for smaller farms to enlarge the size of their business only if

there are no associated differences in land and management resources or in the extent to which an optimum combination of products and factors with levels of technology have been attained. If larger farms generally choose, say, more profitable rotations, better rations for livestock, adopt improvements more quickly, are located in more level areas, or obtain a higher output from given inputs in specific enterprises, the observed differences may be due to these things rather than to differences in size.

In the comparative method, economic theory can be helpful in assisting the research workers in the selection of farms for comparison. In many cases, however, the limitations placed on legitimate comparisons will rule out important variations that should be considered. For example, probably few small farms on Hayesville-Halewood soils in western North Carolina have established a dairy enterprise and improved pasture though it apparently represents a desirable alternative.[5]

In the *budget method* of farm management research considerably broader opportunities exist for the utilization of economic theory in a positive manner. Its function is to help the research worker at each step to choose the *significant* relations for analysis. In this approach the significant conditions can be made explicit. In fact, the budget approach can be visualized as the extension and adaptation of the analytical methods of economic theory to specific farm situations.

Homogeneity of land resources can be approximated by the classification of farms by comparable soils resource groups. Farms then can be selected to represent major differences in management abilities, systems of farming, and sizes of farms. A recent study in Haywood County, North Carolina, illustrates an interesting approach to this problem by the use of soil capability maps and information on farm organizations obtained from the Bureau of Census and other sources.[6]

For each situation, input-output relations resulting from differences in techniques, combinations of factors, and products produced can be estimated. Theory can help in this process by enabling the research worker to greatly reduce the number of alternative combinations explored. The physical relationships to-

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[5] See S. W. Atkins, "Classification and Analysis of Farms, p. 9. Haywood County, North Carolina. Preliminary Mimeograph for review.

[6] *Ibid.*, pp. 1–9.

gether with the expected future prices provide a basis for analyzing the adjustments that will maximize farm earnings in each production situation. In farm management as in economic theory the input-output relationships are developed separately for relevant enterprises and levels of technology before they are combined into the farm business.

Often it is desirable to analyze separately the effects of specific types of adjustments. The information made available in the budget approach permits the separation of particular cause-effect relations. A recent study, for example, analyzes the effects of sizes of farm on utilization of labor, machinery and equipment on corn livestock farms in eastern Nebraska.[7] Another recent study deals with the efficiency of workstock and tractors in the Yazoo Mississippi Delta.[8]

Problems in Using Production Theory

The relation of economic theory to the analysis of empirical data is more explicit in the *budget* method than in the comparative method of farm management research. But even here relationships are not always clearly understood. In view of the current emphasis on this approach it would seem desirable to explore some of these problems.

A major complication arises because economic theory assumes as given the techniques of production. Stigler says in this connection:

> "It is clear that from a given quantity of various productive services it is usually possible to secure numerous different amounts of the same product depending on the technique that is employed. It is customary to rule out this situation by assuming the best technique is employed; that is the technique is employed which maximizes the product from the given combination of the productive services."[9]

From the standpoint of farm management this is often equivalent to throwing the baby out with the bath water. The choice of suitable kinds of inputs in our changing economy may in many cases be much more important in maximizing efficiency than the

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[7] O. J. Scoville, "Size of Farm and Utilization of Machinery, Equipment and Labor," BAE. Unpublished.

[8] J. P. Gaines, and Grady B. Crowe, *Workstock vs. Tractors in the Yazoo Mississippi Delta.*

[9] George Stigler, *The Theory of Competitive Price*, p. 110.

choice as to specific quantities of inputs. Technology as used here includes such things as: (1) New varieties or kinds of crops, (2) establishment of improved pastures, (3) improved types of haying equipment, and (4) methods of controlling diseases and parasites. In economic terms they result in a shifting of production functions and of cost curves which can enable more to be produced with the same or less inputs. The shift from native to improved pastures, for example, may enable the farmer to increase livestock numbers and at the same time reduce total costs because of the reduction in feed costs.

Further, the input-output relationships will vary greatly depending on the type of land and management abilities. Not only will the crop yields, for example, be different in the Claypan area of southern Illinois than in say the Central Corn Belt, for example, but variations in rotations may have different responses.

In farm management research the abstract models of economic theory must be adapted and expanded to meet the specific conditions which exist. In this process of adaptation and expansion, we may often need to guard against becoming overly impressed with the *particular* aspects of the problem of economic efficiency that are treated in detail in the theory of the firm. Is there a danger, for example, in studying the efficiency of dairy farms in a given area that we may unconsciously organize our project to get great details in regard to, say, input-output relations from various quantities of grain and hay feed to cows and various amounts of these combinations, and perhaps too little detail on such problems as the best grades of cows, the desirability of using rapid milking techniques, economy of disease control, methods of hay production or the desirability of investments in improved pastures. Is it possible with (a) data over a relatively small range, and (b) the judicious use of theory and judgment of technicians and farmers to estimate the relevant input-output relationships with sufficient precision to enable constructive analyses?

An associated question in my mind relates to the usefulness in an applied sense of the iso-product *type* of variable proportion analyses. It has a logical elegance highly useful in conceptually separating problems of combination from problems of scale. But is it well suited to agricultural research conditions? The traditional procedure of estimating, for example, the outputs from varying

amounts of fertilizer to the relevant fixed combinations of land and seed appears to be more in keeping with available data than estimates of, say, the combinations of fertilizer and land or fertilizer and seed that yield a given output of corn. Is it desirable to secure the detail necessary to formulate the production surfaces and derive product contours except for unusual conditions?

The theory of the firm assumes that the production functions are given to the economist by the technologist. Farm management workers have recourse to two general types of technologists—agronomists, animal husbandry men and other physical scientists and the farmers themselves. Data from both these sources must be adapted and applied to the specific situation studied with due regard to the kinds of land resources, techniques and the management capabilities etc. Because of the difficulties neither method can claim great precision. Even at this date for example it might be difficult to estimate the precise effect of hybrid seed corn on corn yields in specific areas of the country. What effect should the limited technological information have on our research in farm management?

The infinite variety of possible input-output relationships arising from differences in combinations of factors, products and scale for various levels of technology and resource combinations poses *important problems in selecting for study the relationships that are believed to affect significantly the efficiency of farms.*

If the research worker attempted to explore all possible alternatives he would never get through. Hence it is necessary to make some choices and some of them need to be made in advance. Much better results can be obtained if the major problems in increasing production efficiency can be selected for concentrated study. In this process there would seem to be no substitute for the joint use of imagination, observation (or "facts"), and theory (or logic) in order to formulate hypotheses regarding the nature and importance of the various problems affecting economic efficiency.

There are two general ways of narrowing farm management research, using the budget approach to a point where it can be used effectively in analyzing problems of economic efficiency. Certain aspects of the general problem of production or certain aspects of particular problems of production can be selected for study, such as: soil conservation, capital-labor substitution, forage production,

changes in technology or the feeding of livestock. Here the object is to study the efficiency of production from a particular standpoint. But often final conclusions will require analysis of most other aspects of the farm business because of important interrelationships. The desirable rotation, for example, may vary among groups of farms, depending on the combination of land resources on the farm, the desirable combinations of livestock enterprises and the desirable levels of technology. Another approach is to analyze the major adjustment opportunities on a more limited number of farms where the resource and management conditions are relatively homogeneous and can be effectively specified.[10]

In either case, intelligent research suggests a careful review of general production conditions on farms in order to formulate hypotheses regarding the nature and importance of problems of efficiency as among the various farms, and the extent to which these farms can be classified into similar groups from the standpoint of adjustment opportunities. After the selection of a significant problem of adjustment it is equally important that the limited number of "representative" farms be carefully selected to represent the major differences in opportunities for adjustment.

This process assumes that each farm is not a unique case. It attempts to specify these production conditions by reference to the significant economic attributes including resources, size of farm factors employed and product produced. For example, adjustments desirable to maximize efficiency on low production farms may have some broad elements of similarity. Further, small farms producing similar products, employing similar factors of production, with similar levels of management, and facing similar production opportunities from the standpoint of adopting alternative biological or mechanical techniques and for off farm employment would be expected to have a considerable degree of similarity with respect to adjustment opportunities. Alfred Marshall's concept of the tendency toward the "representative firm" in each industry must be refined to take account of the differences between the assumptions and actual conditions in agriculture.

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[10] For recent studies of this type see, for example, *Opportunities for Adjustments in Farming Systems Southern Piedmont Area*, W. W. McPherson, W. H. Pierce, and R. E. L. Greene, N. C. Tech. Bul. #87, 1949 and "New England Dairy Farm Management Project," this *Journal*, May 1950, Richard Wheeler.

Summary

The central objective of farm management research is to improve the economic efficiency of farm production by solving economic problems of production relating to the operation and management of farms. In farm management research, imagination, observation, and economic theory (including common sense) are all essential. The theory of the firm provides us a valuable "framing tool" of logic to guide the nature of our observations or assembly of "facts" and to shape our conclusions. By a joint application of imagination, economic theory, and observation at every step of the research process our efficiency as research workers can be greatly improved. All of these are needed at every stage of the research process from the choice of the problem, the formulation of the hypotheses, the gathering of the data, the establishment of relationships to the development of recommendations.

SOME PROBLEMS OF JOINT USE OF THEORY AND EMPIRICAL DATA IN FARM MANAGEMENT RESEARCH

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THE title of this paper as given for interpretation may suggest to some farm management workers that there are three methods of farm management research; namely, the theoretical approach, the empirical approach, and a combination of the two. While there may be a distinction between theory and practice, it doesn't necessarily follow that the approach to a research problem has to be categorized as theoretical or empirical. Rather the writer will take the stand that the most satisfactory method is that in which theoretical concepts and empirical observation are jointly employed by the researcher. When extension of theory is to be the end product of research, deduction from basic propositions (fundamental theory) and empirical observation is the logical course. Pure empirical research without the benefit of theory, excepting that which describes a universe or a historical sequence of events, is an infrequent occurrence. The researcher who contends that his research is in no way based upon theoretical concepts is frequently disregarding his background of knowledge from which he formulates hypotheses.

Thomas Cooper, Director of the Kentucky Agricultural Experiment Station, has set forth the view of administrators of Land-Grant Colleges in such a way that the conclusions are obvious:

> "We need 'hard-headed' scientists in the field of rural social science but there is no longer any important place for the pure empiricist. Rural social science will be built in the future, as the significant phases have been in the past, by those who combine a broad grasp of fundamental theory with the ability to keep it always in the closest touch with empirical fact. The day of 'shot-gun research' and the 'collection of facts for fact's sake' is drawing to a close."[1]

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[1] Thomas Cooper, "Training and Recruitment of Agricultural Economics Personnel, IV; A Training Program," this *Journal* 22: 558–561, 1940. Similar views are expressed in articles written much earlier. Some examples are: H. C. Taylor, "Research in Agricultural Economics," this *Journal* 10:33–41, 1928; E. W. Allen, "Need for Specific Objectives in Economic Research," this *Journal* 8: 16–25, 1926; and Sherman E. Johnson, "The Theory of Combination of Enterprises on Individual Farms," this *Journal* 15: 656–667, 1933.

Before undertaking our problem we will try to make clear an understanding of the concepts of theory, empirical data, farm management, and research. The attempt here is to suggest a working concept.

Empirical data are those pertaining to, or founded upon, experiment or experience. Empirical data for farm management research are secured mostly from experiments of research agencies or from farmer experience.

Farm management refers to the making of decisions about the organization and operation of particular farms, with the idea of maximizing some end (ends) and minimizing the means. As a study, it is concerned with interfirm, intrafirm, and interregional relationships of resource efficiency and productivity. The decisions are futuristic and predictive in that action is of the future (short or long time) based upon expectations which by definition are predictive. Furthermore, the decisions are a reflection of knowledge and the use of facts.

Economic theory is largely an empirical science which seeks to uncover patterns of uniformity when certain conditions are true. It is composed of a set of deductive theorems, usually, but not altogether, derived from the facts and from experience. In general, its basic propositions (fundamental theory) are generalizations from empirical observation. The constructions (synonymously called theorems, models, frames of reference, conceptual background, hypotheses, etc.) which usually characterize theory are supposed to render intelligible a fact or thing which they resemble or parallel. They are not expected to be borne out exactly by empirical observation. These constructions, often called "pure economics," provide the farm management workers with logical solutions to be subjected to empirical test. What is called "pure theory" only thrives, for practical use, when contemporary research is capable of making full use of existing theory and of furnishing the theorists with new problems for solution. Thus, there is a complementary relationship between useful theoretical concepts and empirical observation. Such a functional partnership in farm management research can be the best assurance of a progressive science, highly respected and widely adapted.

Research in farm management has as its objective the development, elaboration, and refinement of economic principles of farm operation supported by the necessary empirical materials to be

used to guide farm firms in attaining their objectives, individually and collectively. "Good research" is a procedure following the scientific method to the solution of a problem. The procedure of the so-called "pure research" and "practical research" is the same even though the "ends" may differ.

The Apparent Problems

Evaluation of the relationship of theory and of empirical research in farm management would not have been proposed unless someone thought a problem existed. From discussions with other workers the problem of joint use of theoretical concepts and empirical observations apparently arises from a condition of doubt and confusion about an assortment of issues, most of which are of methodological nature. The writer shares with other workers a sincere desire to see farm management research hold a high position among the social sciences.

The problems that seem appropriate for inclusion in this paper are: (1) Classifying the field called "farm management," identifying the segments with developed theory, and clarifying the procedures of verification. (2) Reconciling the barriers caused by terminology and symbolic presentation. (3) Selecting and handling the appropriate production functions for a farm management problem under study. (4) Securing the data of physical relationships for applying economic analysis. (5) Using the generally accepted accounting system for inductive analysis to reach a solution.

Any one of the areas noted above is worthy of more study than will be possible in this paper. No doubt other important areas can be suggested, such as a reconciliation of "micro" and "macro" relationships. However, to the rank and file of farm management researchers the above are of primary importance.

Classification, Identification, and Verification

Without a clear understanding of classification of the field called "farm management," identification of the respective classification with theory, and procedures of verification, the farm management researcher becomes quickly lost in the maze of infinite numbers of variables and their importance to a problem. The complexity of the front presented by these three associated steps of research is probably one of the most important problems in reconciling empirical observation with theoretical concepts. The problem spe-

cifically is: first, one of refinement, and second, of interpretation so that more of us can seek solutions with greater confidence to our research problems by methods which are generally understood and accepted.

Examination of farm management texts provides a good cross-section view of what different authors call "farm management." The chapter headings indicate a broad field of varying interpretations of its important segments. They may be classed as representing eight types of subject matter:[2] (1) resource and product combination, (2) resource efficiency, (3) resource prices, (4) methods for evaluating a farm business, (5) socio-economic relationships, (6) markets, (7) legal aspects, and (8) institutional arrangements.[3]

"The encyclopedia contains many truths. It may consist of nothing else. But its unity can be found in its alphabetical arrangement."[4]

We may rightfully ask, "What is the 'alphabetical arrangement' of farm management?"[5] Farm management is a specialized phase of agricultural economics along with appraisal, finance, tenure, land economics, prices, cooperation, speciality marketing, etc. These specializations grew up out of needs of sufficient magnitude to demand special attention, and have in a sense become institutions in the field of "agricultural economics." The fact that these

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[2] The classification here is the writer's, but it is not suggested as a proper one for delineating the field of "farm management."

[3] The subjects discussed are grouped below. The numbers correspond to the types of subject matter: (1) crop and livestock systems, over-all organization, types of farming, and diversification *vs.* specialization, (2) labor, power, and machinery efficiency, farm practices, farm and farmstead layout, (3) finance and buying a farm, (4) budgeting, farm records, and enterprise cost accounts, (5) family-sized farms, farming as a way of life, the human factor, and characteristics of a good farmer, (6) time and methods of selling, (7) rental and other contracts, taxation and other legal matters, (8) leasing and customary procedures.

[4] R. M. Hutchins, *The Higher Learning in America*, Yale University Press, 1936, p. 95.

[5] In 1922, Handchin set forth the areas of research in farm management which admittedly were areas of popular interest: (1) Cost of production studies, (2) cost of distribution studies, (3) the form of the farmers marketing organization, (4) land problems, and (5) farm organization. Handchin, W. F., "Research in Farm Economics and Farm Management," this *Journal* 4: 1–12, 1922. In 1933, Nourse contacted all Experiment Stations, researchers in the BAE, and the Farm Credit Administration for projects in Agricultural Economics. Farm Management research projects were classified by Nourse as: farm management and accounting, cost of production, regional or type of farming, farm organization, farm power and equipment, and the human factor in farm management. Agricultural Economics was classed as: farm management, marketing, farm finance, land economics, price and income, and readjustment and control. The subject matter of projects listed under the latter classes can be found in most standard texts of farm management. E. G. Nourse, "Reorienting Research in Agricultural Economics," this *Journal*, 16: 200–214, 1934.

specialties do not correspond to the systematic treatment of economic problems and the attendant tools of analysis makes the hunt for "specific theories" to fit "specific fields" a hopeless chase.

An observation by Professor Davenport provides a clue to clarifying our problem.

> "... it must be noted that no science is to be delimited by the nature of its subject matter. Test this, by finding, for example, from the point of view of how many sciences you may discuss a stick of wood. ...
> "That which delimits a field of science is therefore, not the field of facts treated, but the purpose for which the facts are treated. ... "[6]

If we accept the above statement, then the obvious conclusion is that the subject of the science of farm management is management, for the farm corresponds to the "stick of wood"; it is management which is the purpose for which the facts are treated. Management refers to the making of decisions.[7] The link between "decision making" and "problem solving" is theory and empirical observation.

Once the science of management of farms is delineated along the lines suggested by theory, the task of identification of the problems for empirical study with theoretical concepts is greatly simplified; problems of size of business enterprise can draw from the models of scale of operations, problems of choice of enterprises can rely on the models for resource and product combination; problems of farm organization bear a real relationship to the equilibrium conditions for the theory of the firm, etc. In this connection we should note that to provide empirical facts for the economic solution of every problem is impossible. Consequently, answers are more often provided by the logic of economics (farm management principles) than from quantitative data. Our conclusion is that classification and identification of farm problems within the logic of economics will greatly simplify the research task of refining economic principles for farm operation.[8]

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[6] H. J. Davenport, *The Economics of Enterprise*, New York, The Macmillan Company, 1918, p. 24.

[7] The decisions can be made either by the individual or society.

[8] E. O. Heady explores the problem of classification and identification in two articles; he suggests four areas of specialization within the field of Agricultural Economics for particular equilibrium conditions: "(1) production economics as a study of resource combination and allocation, (2) consumption economics as a study of household welfare and income allocation, (3) market economics as a study of price, supply, demand, and other market relationships, (4) resource prices as a step in analysis of functional and personal income distribution." "Implications of Par-

It is unnecessary to elaborate the accepted dictum that research results and conclusions to be significant must be verified. For obvious reasons, a description of the techniques and methods of conducting a given research task is also necessary. With this information another researcher, given the same conditions and assumptions, can presumably duplicate the results. Standard methods of verification are, for the most part, by statistical inference. It is perhaps true that syllogistic logic will in some instances provide sufficient verification. In either event the object is to accept or reject hypotheses with a small likelihood of error throughout the inductive process. The null hypothesis, tests of significance, fiducial limits, and other devices of statistical inference are powerful tools to the farm management researcher.

Econometrics is a set of rules for the joint use of theory, mathematics, statistical estimation, and statistical verification. The determinate system of relations that ties the various economic variables together in the econometric model insures, in a deductive sense, completeness and consistency within the stated assumptions. It also insures that unique estimates exist, and in this manner the probabilities of sound results and conclusions are increased. Econometrics is a new and growing field and offers much as a means of substantiating theoretical concepts with empirical data.

Reconciling Barriers of Terminology and Symbolic Presentation

There is a current trend in agricultural economics toward greater use of technical jargon and mathematical symbols in presentation. Admitting that both are supposed simplifications to expedite the presentation of ideas, a writer does not demonstrate ability to think and express his ideas by "cloaking" his expression with a

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ticular Economics in Agricultural Economics Methodology," this *Journal* (Proceedings) 31: 837–850, 1949.

Within the field of "production economics" he suggests eight problem areas and the economics concept identified with them: "(1) The level of output to be attained from (or in rate of input applied to) fixed or specialized resources, (2) the combination of resources to produce a given output of product, (3) the combination of enterprises within a given time period, (4) the timing of production (sales) given certainty (near) as to price variation—the problem of seasonal price variations, (5) the level of resource conservation, (6) the optimum scale of operations, (7) the method of obtaining control of the resources to be used in production and the consequent combination of resources, (8) adjusting to change and uncertainty of the market and production process including growth of the business over time." "Elementary Models in Farm Production Economics Research," this *Journal* 30: 201–225, 1948.

veneer of jargon and symbols. The real purpose of professional journals or professional meetings is to disseminate ideas so that the science which they represent will be advanced and the resultant "goodness" of that science to society will be utilized.

The authors whose works have stood the test of time (Smith, Mill, Marshall, etc.) did not rely on a stiff terminology or symbolic presentation. Perhaps they over-simplified their ideas. However, it is a fact that the task of the researcher is problem solving. There are many researchers working to apply economics to problems. There are only a few who dig deeply in theory and mathematics. If the ideas of the latter are to be tested by the former, then the ideas of the latter must be understandable and usable.

This discussion is not to provide consolation to those who suffer an inferiority complex because of inability to converse with or understand the writings of the so-called "pure-researcher." A great deal of the pure researcher's language is legitimate and of long years' standing. To be willing to be called an economist without assuming the responsibility of understanding the language of the profession is a breach of ethical standards.

Obviously, there is a great need for all workers to be more patient with other workers by attempting on the one hand to express ideas in understandable form, and on the other, to try to understand those presented.

Selecting and Handling Production Functions

The production function to the researcher expressed mathematically or graphically may represent his model or hypothesis of presumed relationships; it can also be a description of a relationship derived from empirical observation. Selection of appropriate production functions to explain a relationship between variables is often difficult but important to connect theory and empirical data. Once they have been selected or determined, resort to economic theory provides solutions to be rejected or accepted by the rules of statistical inference.

Selection of the method and evaluating the effects of variables are frequently difficult because of the multi-variable complex and interdependence of relations among the variables. The input relations are conceived as perfect or imperfect substitutes, complements, or fixed proportions. Most of us do not have nor can we obtain sufficient advance knowledge of the interrelation between

inputs in different uses to combine them. For example, statistical inference about any one of the complementary variables, individually, has little practical significance. Frequently we can obtain assistance by a thorough canvass of the empirical research of the social and physical sciences bearing on the problem. Deduction in this manner reduces the likelihood of error in logic (reflective thinking), in addition to suggesting the likely importance of the variables and their mutual interdependence. Otherwise, recourse to trial and error combinations to determine correlation and regression coefficients is our main resort. Admittedly, the task is slow and laborious.

It would be unrealistic to assume that the exact marginal increments at particular points on a production curve or production surface (a production function), as developed by a researcher, are precisely applicable to any farm. Farmers must be guided by a knowledge of the general shape of the curve or surface, the importance of the variables as they influence the nature of the curve or surface, and the particular conditions on their farms. Preciseness in the formulation and mechanics of the production function itself is necessary, but the principle (principles) it demonstrates usually has general application.[9]

Securing Physical Relationships Data for Applied Economics Analysis

Lack of adequate data showing physical relations between variables has forever been the plague of workers doing farm management research. Without access to physical equipment the social scientist has to rely on the physical scientist for primary data, or he has to sample some universe and devise various statistical measurements.

Empirical observations by the physical scientists have tended to be derived from experiments designed to compare different production functions to produce a type of output (milk, beef, corn, etc.). Their goal has been, until recent years, to seek combinations of varying kinds of inputs to secure a maximum output rather than to pursue a single production function through the different levels of input-output combinations. As an example, animal scientists have done much research comparing feed combinations when

[9] The content of this paragraph is similarly expressed by J. D. Black, "Dr. Schultz on Farm Management Research," this *Journal* 22: 570–580, 1940.

each combination is made up of different feeds (each a different production function unless they are perfect substitutes), rather than taking one combination (corn, alfalfa hay, and soybean oil meal) and varying the ratio of each to the others (substitution), and varying the level of total input (output response to incremental inputs). While the type of research done is necessary and valuable, the farm management researcher needs, in addition, the latter type of information to extend the economic analysis. Economic analysis of empirical observations when production functions are compared can only be valid when the input combination for each production function is optimum. This assumes that the physical scientist can a *priori* or from previous empirical observation, select the economic optimum combination of each production function compared.

In recent years our physical scientists have begun to appreciate the marginal concept and are designing their experiments to explore the substitutability and complementarity of inputs and the output response of varying levels of input. An outstanding example in this direction is the work of Jensen and others.[10] Work by Sherwood and others at North Carolina on the effect of fertilization on pasture herbage is in the direction of conceiving production surfaces.[11] Sherwood shows, graphically, three dimensional production surfaces and production contours. When such work is in greater evidence the farm management researcher will find his research task much simpler, and confidence in marginal analysis as directed by theory will mount.

The simplest of the production functions for mechanical manipulation are those that describe linear relationships. A noted economist states in his classroom that straight-line relationships in the actual world are most frequently statistical phenomena contrary to fact. Curvilinear relationships, while more realistic, are also more difficult to handle.[12] The animal scientists' most widely accepted basic theory of feeding livestock is one of presumed straight-line relationships. The Haecker or Morrison Standard

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[10] Einar Jensen, and others, *Input-Output Relations in Milk Production.* USDA Technical Bulletin 815, 1942.

[11] F. W. Sherwood and others, "Effect of Fertilization on the Nitrogen, Calcium and Phosphorus Contents of Pasture Herbage." *Jour. Am. Soc. Agron.* 39: 841–859, 1947.

[12] The mechanics are simplified through the use of logarithms to simulate straight lines. However, neither the linear or logarithmic relations have sufficient flexibility.

assumes that the necessary feed input is a function of maintenance and output. This is an inverse conception of the usual relationships that output (Y) is a function of inputs (X_1, X_2, $X_3 \ldots X_n$). Their theory, in general, assumes that the feed requirements for maintenance are a function of one variable (weight) and are constant over all ranges of output. Production can occur only when the feed input exceeds maintenance requirements. It is a function of total digestive nutrients consumed and is constant over all ranges of output; i.e., a pound of beef gain is obtained from consumption of 3.53 TDN above daily maintenance, or a pound of four percent milk is produced from .341 TDN above daily maintenance.

Basically, the Standard says that the feed fed today depends on the output yesterday, rather than the output tomorrow depends on the feed fed today. What is the true marginal input by this method? By adhering to this method it would seem that only when the Standard is wrong will the resultant output show increasing or decreasing returns to an increment of input; e.g., suppose that the Standard for the milk produced yesterday was too low; the feed fed today would result in decreased production tomorrow, leading to the conclusion that returns will diminish for an additional input of feed. The way a dairyman would experience an increase in milk production would be in the event that the Standard overstated the needs and successive adjustments would continually call for increased production.

By using total digestible nutrients as a common denominator the assumption of perfect substitutes is apparent; i.e., a TDN of grain, protein supplement, and forage substitute perfectly for each other. The obvious fallacy of complete substitution of one for the other two is avoided by defining limits within which the substitution process is possible. However, within these limits perfect substitution is assumed. These assumptions are not universally accepted by all animal scientists, but the idea is so securely intrenched that much of the research data available to the farm management researcher are based upon the Standard and perfect substitution of nutrients.

Plant nutritionists have leaned heavily upon Liebig's law of the minimum or the "balance-sheet theory" or "the soil-is-like-a-bank" idea.[13] Knowing the needs of plants and the available plant

[13] Chas. E. Kellog, "Conflicting Doctrines about Soils," *Scientific Monthly*, 66: 475–487, 1948.

nutrients, we can determine what plants are adaptable or what fertilizers to apply. Crops will grow, Liebig said, in direct proportion to the increase or diminution of the nutrient elements of the soil. How many of you have seen the diagram showing a barrel with each stave labeled some plant nutrient and water spilling over the shortest stave?

The above theory implies fixed proportions of the plant nutrients. The balance-sheet theory is currently in disrepute among the hierarchy of soil scientists, but many long-time experiments in force were designed on the basis of this theory. Mitscherlich's work as explained by Wilcox clearly states the fixed proportions of the "big three" fertilizing elements for all plants (agrobiologic optimum) is $5N-1P_2O_5-2K_2O$.[14] The work of Sherwood at North Carolina shows that the plant nutrients act as substitutes for each other.[15]

At this point it is obvious that the basis theories of the physical sciences and the fundamental models of economic theory in many instances conflict at some important point. Their straight-line theories, fixed proportions or perfect substitutes do not correspond to our curvilinear theories of marginal analysis. Who is right? To assume that we are wholly right and they are wholly wrong would be fallacious reasoning. It is highly probable that some segments of production theory need reorientation. A sincere attempt by capable persons to understand and to reconcile the basic propositions of the respective sciences would be a significant forward step.

The Accounting System Used for Inductive Analysis

The task of the accounting system to farm management research is to provide a classification of data for use in analyzing economic problems. An important economic rule is that resources should be allocated among competing uses in a manner that their (discounted) marginal value productivities are equal in all uses. In this manner maximum allocative efficiency is attained on the farm, between farms, and between farming regions. In determining these productivities the researcher seeks the *true* inputs of the resources.

Constant real estate values over years, straight-line depreciation, flat rates of interest, and in late years the tendency toward orienting the accounting system to fit income tax computation, produce

[14] O. W. Wilcox, *ABC of Agrobiology*. New York, W. W. Norton & Company, 1937, p. 64.

[15] Effects of fertilization . . . , *op. cit.*

data which are of questionable value in determining the value productivity of resources.

Valuations of the asset structure are assigned as market values, actually or subjectively determined. These values form the base for computing depreciation schedules and charging interest on investment. Depreciation rates are generally straight-line charges based upon some historical average. Interest on investment is usually charged at four or five percent and bears only a casual relation to the market rate. These fixed costs added to the variable costs are frequently used as the inputs to a business. By the manner of subjective determination of value and assumed straight-line costs, how can the researcher derive any set of cost or income curves corresponding to the theoretical models? The irony of the situation is that these subjective and straight-line data are on one side balanced against each other as the cost of the business as a whole, and on the other side as the income to the business of the whole. Obviously a theoretical model depicting expected relationships has only a slight chance of becoming a verified hypothesis if data of this type are relied upon.[16]

The part of the accounting system as noted above must be modified for farm management research, granting that the usual method may serve its purpose for determining business profits and filling out income tax schedules. Given a problem, the researcher must modify the accounting system so that the data produced by it will be usable for verifying hypotheses, rather than assume that one system will suffice for all problems.[17] Obviously the task is much

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[16] The problem is an old one. E. W. Grimes, "The Problem of Interest and Rent in Cost Determination," this *Journal* 5: 79–85. 1923: J. D. Black, "Dr. Schultz on Farm Management Research," this *Journal* 22: 571–580. 1940: The Social Science Research Council Series: *Research in Agricultural Income*, Bul. No. 6. 1933 and *Research in Farm Management*. Bul. No. 13, 1932, p. 262.

[17] For some types of studies Keynes' concept of "User Cost" may be worthy of consideration. He defines it as " . . . simply the equivalent of the current disinvestment involved in using the equipment. . . .

"An entrepreneur's user cost is by definition equal to

$$A_1+(G'-B')-G$$

where A_1 is the amount of our entrepreneur's purchases from other entrepreneurs, G the actual value of his capital equipment at the end of the period, and G' the value it might have had at the end of the period if he had refrained from using it and had spent the optimum sum B' on its maintenance and improvement." His concept, while involving difficulties of computation and still retaining subjective valuations, does correspond more nearly to the ideal concept of the actual input into a production process. The fact that the cost due to use can be charged as variable cost rather than as fixed cost is a point in its favor. J. M. Keynes, *The General Theory of Employment, Interest and Money*. New York, Harcourt, Brace and Company, 1936, p. 67.

broader than presented here. Allocation of returns to the responsible agents or about the same thing, income accounting, also brings about difficulties which may lead to conflicting conclusions. Careful thought to developing accounting systems for specific purposes is needed.

Conclusions

The problems of joint use of theory and empirical data in farm management research are not those brought on by the introduction of theory, but rather they are those present either when the approach leans heavily on empirical observation or when it leans heavily on theoretical concepts. It is true that greater use of theory causes the researcher to be more conscious of factor relations because his model, which is a theoretical solution, is precise in specifying the relations between variables.

There is much opportunity for further thinking and research to reconcile theoretical concepts and farm management empiricism. In a sense, the system of Land Grant Colleges tends to discourage thinking because results are often measured in pages of published information. The result has been, in many instances, large chunks of unrelated and undigested data. Conceiving the solution of a problem through the use of theory is to employ economic logic; this requires intensive use of the thinking processes, which to most of us is hard work.

No science which deals with concrete phenomena can progress very far until it is able to make precise quantitative measurements of its data. If we accept this hypothesis, the tasks of highest priority in moving farm management research forward are:

(a) Classification of the field called farm management, identification of the respective classifications with theory, and clarification of the procedures of verification. (b) Reconciliation of the obstacles brought about by use of technical jargon and symbols. (c) Simplification and demonstration of the tasks of selecting and handling appropriate production functions which link theory to empirical observation. (d) Work with the physical scientists to seek a common understanding with respect to fundamental theories in related sciences. (e) Provide solutions to the apparent inconsistencies in farm management data that originate with the accounting system.

SOME FUNDAMENTALS OF CONSERVATION ECONOMICS AND POLICY*

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THE purpose of this study is to outline some economic fundamentals in resource conservation. It is not an innovation in this sense. Previous investigations have made important contributions.[1] Too, conservation is not entirely a unique problem in economics. On the one hand, it is simply one of production economics. As in other areas of production, the problem is one of allocating scarce resources between competing alternatives (different time periods). With this exception, the optimum level of conservation is defined (given the choice function) within the framework of production economics principles. Competition is between "many periods" on into eternity. In the following analysis the problem has been restricted to competition between two time periods, t_1 (the "present") and t_2 (the "future").[2]

Intertemporal Joint Products

Resources can be divided into two "basic" and "pure" categories, depending upon the nature of the intertemporal joint products. *First* are those resource services which are intertemporal "joint products" in fixed proportions (sometimes termed "flow" resources). Examples include rainfall, sunshine, scenery, and power

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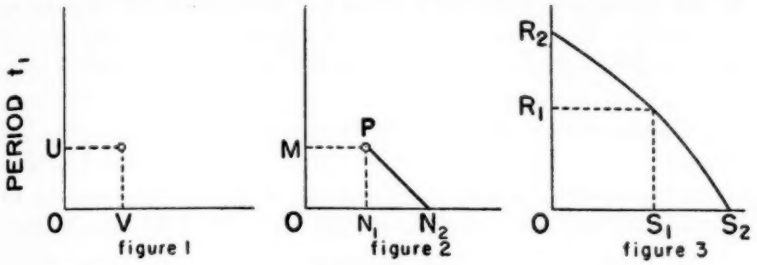
* An abridgement of papers on the theory of conservation presented (through the request of the North Central Farm Management Research Committee on soil conservation) at Montreat, North Carolina, and at the University of Chicago efficiency seminar. O. J. Scoville, Bureau of Agricultural Economics, assisted in preparation of this paper.

† Journal paper No. J-1716, Project 1085, Iowa Agricultural Experiment Station. For an applied discussion of similar conservation problems in agriculture, see Heady, "Efficiency in Public Soil Conservation Program," *Jnl. of Pol. Econ.*, Feb., 1951.

[1] See especially W. W. Wilcox, "Economic Aspects of Soil Conservation," *Jnl. of Pol. Econ.* Vol. 46; H. Hotelling, "The Economics of Exhaustible Resources," *Jnl. of Pol. Econ.* Vol. 39; A. C. Bunce, *The Economics of Soil Conservation*, Iowa State College Press, 1942; L. C. Gray "The Economic Possibilities of Conservation," *Quar. Jnl. of Econ.* Vol. 27; S. von Ciriacy-Wantrup, "Economic Aspects of Conservation," this *Journal* Vol. 20.

[2] Additional periods could be incorporated into the analysis by resorting to higher mathematics. However, this step has not been taken in order that simplicity be retained. The basic principles and conclusions are similar in any case. The length of the time period (t_1 or t_2) is also irrelevant. It may be a time span of any number of years.

from streams. The possibility does not exist for substitution of the "flow" from one time period for that of another period.[3] (Illustrated in Figure 1 where the axes measure the quantity of the *service* itself available in t_1 and t_2.) The intertemporal combination can be only one of OU in t_1 and OV in t_2. The service cannot be stored from t_1 to t_2 nor can it be withdrawn from t_2 to be used at an earlier date,



t_1. Second are those intertemporal joint products (resource services) which have a latitude of substitution between time periods. They arise from stock (exhaustible) resources such as coal, petroleum, and certain soil mineral deposits. A sacrifice in use of the service in one period increases the quantity available in another period, as is illustrated in Figure 3. (The axes indicate the quantities of resource service available in different time periods). The line R_2S_2 is the intertemporal opportunity or iso-resource curve. It indicates the various possible intertemporal combinations of services possible from given (equal) stock resources. In the illustration the opportunities are as follows: (1) The total services (OR_2) can be used in period t_1; (2) The total services (OS_2) can be used in period t_2; (3) The intertemporal combination can include OR_1 in t_1 and OS_1 in t_2, or any other combination shown on the intertemporal opportunity (iso-resource) curve. A greater use in one period always necessitates a sacrifice of service in another period.[4]

[3] Aside from short-run fluctuations in climate, the quantities of the important flow services available in different time periods are equal.

[4] In Figure 3, as is indicated by the convexity of the curve R_2S_2, the rate of intertemporal substitution is at an increasing marginal rate. Each successive increment of services in $t_1(t_2)$ necessitates increasingly greater sacrifices of services available in $t_2(t_1)$. Another possibility is substitution at a constant rate (as suggested by the linear intertemporal opportunity curve PN_2 in Figure 2). However, Figure 3 (increasing marginal rate of substitution between time periods) is the most likely case; expansion in "current" services by increasingly greater magnitudes is possible only as easily accessible deposits of basic resources are exploited. Accordingly, supplies

This analysis has been in terms of the services derived from basic resources. *Consumption commodities*, derived directly from the resource services (and derived indirectly from the basic resources), can be treated in the same manner. In Figures 1, 2 and 3 the axes now indicate the combinations of intertemporal *products* available for consumption from the categories of basic resources in the different time periods. However, one additional breakdown is possible. The commodities derived from flow resources are of two sorts: (1) *Those commodities which involve direct consumption of flow services* (water, atmosphere, scenery, etc.). The intertemporal relationship is again that of Figure 1 where commodities are "produced" in fixed proportions. This combination is the only possible one since direct consumption of the services cannot be postponed from one period until the next. (2) *Those commodities which are derived from flow services and can be stored from one period to the next.* The power from the flow of wind or water can be captured (through generation of electricity) and transformed into a storable product. Or, agricultural commodities produced in one period can be stored until another. There are thus two alternatives. (a) The resource services or commodities can be consumed within the same time period; (b) The services or products can be transformed into commodities in an early time period (t_1) and stored for consumption in a later period (t_2). This situation is illustrated in Figure 2 where the intertemporal opportunity curve is MPN_2. Since the resource *services* are available in fixed (and equal) proportions between time periods, consumption of the *products* at the time they are derived in periods t_1 and t_2 would allow OM consumption in the former and ON_1 consumption in the latter period. However, since all of the product produced in the earlier period (t_1) can be stored until the later period (t_2) the maximum quantity of commod-

of "future" services may suffer in absolute amounts for two reasons. The less productive deposits which might otherwise have been extracted, are lost, as gas pressure diminishes, coal shafts collapse, etc. Too, even in the absence of this absolute loss, a diminishing rate of extraction is necessary over time relative to a given quantity of "working resources" (labor and capital for extraction of the basic resources): A greater output of services in one time period (t_1) from a given (X) quantity of "working resources" is possible only through extraction of the most productive (accessible) deposits. (The productivity of X "working resources" in period $t_2(t_1)$ is an inverse function of the productivity of the same X resources in $t_1(t_1)$ except for the complementary case noted later.) We employ the notion of increasing marginal rates of substitution for "stock" resource services in the analysis which follows. However, the basic principles would be exactly the same were the concept of constant rate employed.

ity available in t_2 is equal to that produced in the later period (ON_1) plus that stored from the earlier period (N_1N_2) (which is equal to OM if the product does not deteriorate or grow in storage).

Intertemporal Consumption Relationships

Up to this point intertemporal production alone has been discussed. Intertemporal consumption relationships can be expressed by means of the conventional indifference curves and indicate the

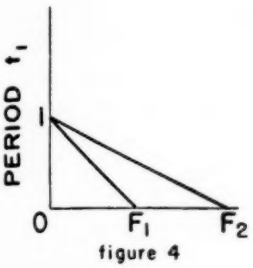


figure 4

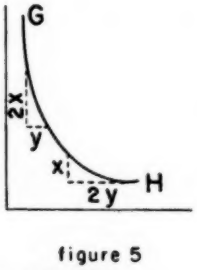


figure 5

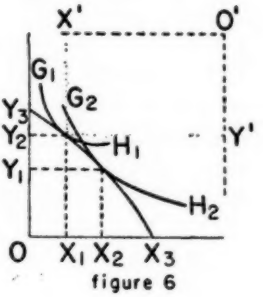


figure 6

PERIOD t_2

various intertemporal combinations of products which make possible a given (equal) total consumer utility. An acceptable hypothesis is that future and present goods substitute at diminishing marginal rates. This situation is expressed in the concavity and slope of indifference curve GH in Figure 5. The smaller the quantity of t_1 goods the greater the quantity of t_2 goods necessary for their replacement and vice versa.[5]

[5] It is more realistic than suppositions in many expositions on interest and conservation that the total of goods in a future period is discounted by a given amount as (say) 5 percent. At some level of consumption the consumer or society places an increasingly lower value on present (t_1) than future (t_2) goods and vice versa (apart from the length of the time periods). The slope of an intertemporal indifference curve will then depend on two major factors: (1) the relative values which present individuals attach to their own consumption in different periods, and (2) the values which present individuals attach to consumption by individuals of future generations. The latter is a question of the extent to which present generations value survival of future generations and the level at which they wish future generations to live relative to their own standard. In the analysis which follows we employ an indifference curve of the nature indicated in Figure 5. The basic conditions of equilibrium would remain unchanged were we to employ the alternatives of Figure 4. One unlikely possibility is that consumers do not "discount" future goods. In this case the intertemporal indifference curve is linear (IF_1 in Figure 4) indicating constant marginal and equal absolute rates of intertemporal substitution. A second unlikely possibility is that the consumer discounts the future but by a constant marginal rate (IF_2 in Figure 4). However, two units in t_2 are necessary to offset one unit in t_1. (Commodities "stored" or "conserved" from t_1 to t_2 are discounted

Intertemporal Welfare

Given the production and consumption relationships outlined previously, the rate of resource use which maximizes intertemporal welfare can be defined. First we examine the three production opportunities. Later we relate these "unique" cases. (1) *Stock-derived products.* For a society in which stock resources alone are available the conditions which define a maximum intertemporal welfare are illustrated in Figure 6 where Y_3X_3 represents the intertemporal substitution rates of goods in production while G_1H_1 and G_2H_2 represent different intertemporal substitution rates of goods in consumption (disregard the ordinates $O'Y'$ and $O'X'$ at this point).[6] G_1H_1 represents a high (low) value attached to present (future) relative to future (present) goods while G_2H_2 represents a relatively greater value attached to future goods. Intertemporal welfare can be maximized when the marginal rate of substitution of goods in production (Y_3X_3) is equal to the marginal rate of substitution of goods in consumption (indifference curve G_1H_1 or G_2H_2). Geometrically, this is denoted by the tangency of the separate curves indicating production and consumption relationships.[7] In respect to the inter-

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by one-half since $OF_2=2OF_1$.) It has been suggested to the writers that use of indifference curves in analysis of conservation makes less sense than the usual procedure of discounting the future by some given interest rate. Obviously, even the use of a flat discount rate assumes an indifference curve. However, it assumes a constant marginal rate of substitution such as IF_2 in Figure 4. Too, it is obvious that an indifference curve of the nature in Figure 5 also represents a discount of the future.

[6] It is obviously true that the intertemporal utility surfaces are not identical for all individuals. However, the notion of a community indifference curve is useful at this point and leads through the same logic whether it is supposed that it (a) can be derived from heterogeneous individual curves, (b) is for a community of individuals with identical utility surfaces, or (c) represents a community of one individual. It is also likely that the individual's *ex ante* notion of his intertemporal indifference curve differs from his *ex post* notion of this same relationship. Thus if economic action is based on the *ex ante* indifference curve, total intertemporal utility is never maximized. This is a problem in consumer dynamics for which current economic theory provides few solutions. Without "solutions" here it is impossible to formulate a simple optimum time-use of resources in the vein presented here. It has also been suggested to the writers that the use of a "future discount" by (say) 5 percent does not lead into the complexities of assuming a community indifference curve. This is not true, however, since even the notion of a discount society of 5 percent does imply a community indifference curve (except that it is linear).

[7] Total welfare over the two time periods would always be less for any other combination of intertemporal products. The tangency of the two curves denotes a maximum utility: (1) An indifference curve indicative of a greater total utility over time would not be consistent (could not be attained) with the quantity of products possible (over the same time period) from the given deposit of resources. (2) An indifference curve which intersects (one lower relative to both the X and Y axis) the production curve would represent a total utility less than could be attained with the given deposit of resources. This is evident from the fact that the

temporal indifference curve G_1H_1, welfare is maximized over time by production of OY_2 and OX_1 in the time periods t_1 and t_2 respectively. The quantity Y_2Y_3 (equals OX_1 if resources do not appreciate or depreciate over time) should be conserved. This is the economic level of conservation. It can be defined in no other sense if the criterion is one of intertemporal welfare.[8] For indifference curve

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consumer would always prefer (total utility would always be greater from) more rather than less of all products from all time periods. Accordingly, greater attainment of all can be realized by higher and higher (in respect to both the X and Y axis) indifference curves until the *one* which is tangent to the production curve is attained. Tangency of the two curves denotes equal slope and hence equation of the ratios of substitution. The relevance of production and consumption ratios are obvious: If (a) one unit of consumption in $t_1(t_2)$ gives as much satisfaction as two units in $t_2(t_1)$ and (b) sacrifice of one unit of production in $t_1(t_2)$ allows one unit of added production in $t_2(t_1)$ then (c) greater intertemporal welfare will be forthcoming by consuming the product (resource) in $t_1(t_2)$. If (a) one unit of consumption in t_1 is equivalent in utility to two units in t_2 while (b) sacrifice of one unit in production in t_1 allows output of two units in t_2, then (c) total welfare will be as great by consumption of all in t_1, all in t_2 or any "in between" combination.

[8] One additional point is of interest previous to our subsequent analysis. In terms of production relationships, the output of one period is not always competitive with that of another period even though the supply of resource services is of fund or stock nature. The production of one period may be complementary with that of another period. This possibility is illustrated by the production opportunity line (CM) of Figure 11. Here the greater the output in period t_1, the greater also is output of a later period, t_2. This possibility exists especially when we relax our conditions of an equal supply of working capital and labor. Extraction of increasing quantities of the "stock" resource deposits (even though these be the most "productive" or "accessible") in t_1 which are not only "consumed" but also "transformed" into working capital, may make possible the extraction of greater quantities of resource deposits (even though these be less "productive" or "accessible") in period t_2. Speeding up the rate of extraction in a current period simply makes possible a greater capital stock and thus an accelerated rate of withdrawal from the given resource fund at a later time. History is, of course, replete with examples of this kind. In agriculture, an exploitation of the soils by the pioneer made possible an increase in numbers of draught animals and tillage implements so that an even greater acreage could be cultivated and exploited. The same is still true to a wide extent, especially on tenant-operated farms. We can now return to our "one generation" consumption relationship and investigate the equilibrium level at which resources will be conserved (or conversely, exploited) if intertemporal welfare is to be maximized. Obviously, there can be no level of conservation which will maximize welfare over (the two periods of) time if production (exploitation) in t_1 is entirely complementary with production (exploitation) in t_2. Total welfare over time will always be greater by withdrawing a greater stock of the resources deposits in t_1. This is evident in the family of indifference curves suggested by I_1J_1 and I_2J_2 representing increasing higher levels of total utility respectively. (The rate of substitution between goods consumed in the two periods is still at a diminishing rate. However, consumers can always attain a higher total level of utility by consuming more of all goods. Indifference curve IJ_2 represents a greater total utility than IJ. The sum of the utility in the two periods will always be increased by exploitation in t_1 since production in t_2 is also greater, and a higher indifference curve is always attained.) As long as intertemporal complementarity exists, there is no economic limit to exploitation. Intertemporal welfare will always be increased by extending withdrawal of resource in current periods. Obviously, if the time periods are long enough, their products cannot be complementary.

G_2H_2 (a higher value on future consumption) OY_1 should be consumed and Y_1Y_3 (equals OX_2) should be conserved in period t_1 if welfare is to be maximized over time. (2) *Flow-derived products in direct consumption.* Only one possibility exists in maximizing intertemporal welfare over time with flow resources alone available. The flow-derived products must be consumed in exactly the proportion in which they are forthcoming. The slope of the intertemporal indifference curve has no relevance. An indifference curve with the slope of either G_1H_1 or G_2H_2 (Figure 6) would denote the same intertemporal rate of use; (OU in t_1 and OV in t_2) (Figure 1). The only economic question here is one of equating marginal cost (in terms of "working" capital and labor) with marginal return of utilizing the service in one period. (3) *Flow-derived products with storage alternatives.* A society falling within this "pure" case and attempting to maximize intertemporal welfare should always consume products during the period in which they are produced if the future is discounted by any amount whatsoever as illustrated by Figure 2.[9] Any indifference curve (denoting maximum utility) with a slope of less than 45 degrees (denoting a greater value on present than future consumption) would be tangent to the intertemporal opportunity curve (MPN_2) at the point P (denoting consumption at the rate of OM in t_1 and ON_1 in t_2). In order for future consumption to be increased at the expense of present consumption in this "pure" case, the indifference curve must have a slope of more than 45 degrees (in some range and of 45 degrees at the point of tangency) denoting a premium on future over present consumption. Here societies of the present would anticipate a greater future need (say, in case of war) or would prefer that (even without technological improvement) future generations live at a higher level than themselves. If the "discrete" periods are long enough it is possible that commodities (produced from flow services) cannot be stored into the next period. This is the case of agricultural commodities where meat and other perishables can be "withheld" from consumption for short periods and storage for grains and other staples is also limited. If the relevant time periods (t_1 or t_2) are long enough, the category of flow-derived products which are storable become synonymous with flow-derived products consumed as the resource service is available ("pure" case II above), and the

[9] Our reference here is to the situation where the product stored from period does not "grow" but either remains constant or deteriorates in quantity.

problem is not entirely one of conservation (competition between time periods).[10]

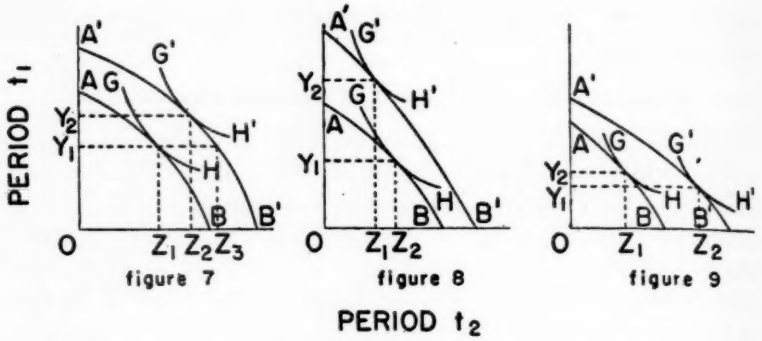
Population Levels, Change, and Optimum Conservation

Two categories of changes affect the level of resource use (conservation) which will maximize intertemporal welfare. These include changes in the intertemporal rates of substitution of (1) goods in production and (2) goods in consumption. Major forces altering the consumption substitution rates are changes in population and changes in tastes (of given populations). The effect of changes in tastes (the relative rate at which future goods are discounted by a given population) are obvious.[11] Differences in population taken alone (in the absence of (1) changes in tastes or relative values of goods in various time periods, and (2) changes in techniques) need not alter the level of conservation which will maximize intertemporal welfare. Suppose that two populations (one of N individuals and another of $2N$ persons) are possible. If the two populations place similar values on consumption in different time periods, the slopes of their respective indifference curves will be identical, and both must consume (conserve) products at the same rate to maximize utility (the transformation curve given). The $2N$ population will have only one-half as much product per person in any one time period but its rate of use between time periods will coincide with that for the N population. (Generally though, the values on the future will depend on the level of goods available in both time periods.)

Changes in the intertemporal rate at which goods in production substitute are brought about mainly by "improved" techniques (including discoveries of new or loss of existing resource deposits). Changes in techniques may conceivably increase, leave unchanged

[10] Some commodities embody both flow and stock resources services. Widespread examples are in agriculture where crops draw both from the stores of chemical elements and the annual flow of sunshine and rainfall. In terms of "pure analysis" this hybrid case is still illustrated by two of our "discrete" and "pure" cases depending upon the limiting elements in production. If the flow resource is available in unlimited and stock services are available in limited quantities, then solution is still in terms of I above. If flow resources are the limiting factor in production, the solution is given in Case I or II above. There are also other "hybrid" flow-stock situations more complex than those outlined here.

[11] In Figure 6, a change in tastes which increases the rate of substitution of future (t_2) for present (t_1) goods would have the effect of altering the intertemporal indifference curve from G_1H_1 to G_2H_2. Accordingly, the level of conservation will increase (from Y_2Y_2 to Y_1Y_1 in t_1). A decrease in the rate of substitution of future for present goods (a shift from G_2H_2 to G_1H_1) has the opposite effect.



or decrease the rates at which resources are conserved (consumed) between time periods. These three possibilities are illustrated geometrically in Figures 7, 8, and 9 respectively where the axes represent the quantities of product possible from given stock resource deposits in periods t_1 and t_2.[12]

[12] Figure 7 is the commonly recognized case in which the new technique results in (changes in tastes or similar variables absent) a greater absolute level of consumption in both the present (t_1) and future (t_2) time periods. In our example, *the relative rate* of consumption is also exactly the same under the new ($A'B'$) as under the old (AB) technique. The new technique indicates that, given a specific rate of use in one period, a greater product (quantity of resource services) is physically possible in another period. For example, consumption at the rate of OY_1 in t_1 would allow consumption only at the rate of OZ_1 in period t_2 under the old technique (AB). Under the new technique ($A'B'$) consumption at the rate OY_1 in period t_1 will allow consumption at the rate OZ_3 in period t_2. Assuming no change in values attached to consumption goods of different periods (as denoted by identical slopes or marginal rates of substitution for indifference curves GH and $G'H'$) total utility will be maximized (at a higher level) under the new technique only if consumption between the two time periods is exactly the same as under the old technique ($OY_1/OZ_1 = OY_2/OZ_2$). This outcome holds true, however, only where the marginal rates of intertemporal substitution of goods in production are the same under the new as under the old technique (AB and $A'B'$ have the same slopes). Figure 8 illustrates the case in which the new technique results in (1) a greater total utility over time but (2) a greater absolute consumption in an early (t_1) and a lower consumption in a later period (t_2) (with no change in the slope of indifference curves). Under the old technique (AB) the level of conservation in t_1 which will maximize intertemporal welfare is OZ_2. The optimum level of conservation is only OZ_1 under the new technique ($A'B'$). Intertemporal welfare is increased and maximized by present (t_1) consumption at the sacrifice of future (t_2) consumption) only because the marginal rates of substitution of goods in production have been altered in the favor of the former time period. Figure 9 illustrates a case in which intertemporal transformation ratios are altered in a fashion which increases and maximizes intertemporal welfare by expanding later (t_2) at the expense of earlier (t_1) consumption. Other alternatives are that both future (t_1) and present (t_2) consumption expand absolutely and either (1) t_1 consumption increases relatively or (2) t_2 consumption increases relatively. In agriculture, such innovations as hybrid corn alone change the transformation ratio toward the present and encourage increased yields and hence a greater soil exploitation relative to the future. Innovations as improved terracing and forages tend to throw an advantage in the opposite direction. In "extractive" industries, innovations which have greater application to easily accessible deposits have the effect of speeding up early as compared to later consumption.

Composite Supply of Stock and Flow Resources

Two pure cases of intertemporal production (joint products (a) in fixed proportion and (b) with a latitude of substitution) have been examined previously. Both categories of resource services exist side by side. An important practical economic problem is the extent to which flow resource services (flow-derived products) should be substituted for stock resource services (stock-derived products) in current periods in order that the latter might be conserved. This is partly the problem in the irrigation and reclamation projects of agriculture where there are alternatives of exploiting the soil in developed farming regions now and initiating irrigation in undeveloped regions later, or in substituting electricity derived from water power for that derived from coal.

The analysis which follows treats equilibrium of production and consumption under the conditions of a supply of flow and stock resources in combination as a "pure" case. Presentation is abbreviated by means of the simple geometrics of Figure 10. *First*, refer to the *oy* and *ox* axes (independently of the *OY* and *OX* axes) which indicate the situation for stock resources alone. The transformation curve y_2x_2 indicates the intertemporal production opportunities. Given the intertemporal indifference curve *GH*, the optimum rate (as denoted by tangency of *GH* and y_2x_2) at which the product derived from stock resources should be consumed in t_1 is oy_1 if intertemporal welfare is to be maximized. The product conserved in t_1 and consumed in t_2 is y_1y_2. *Second*, consider the situation of flow resources alone and refer to the *OY* and *OX* axes (disregard the

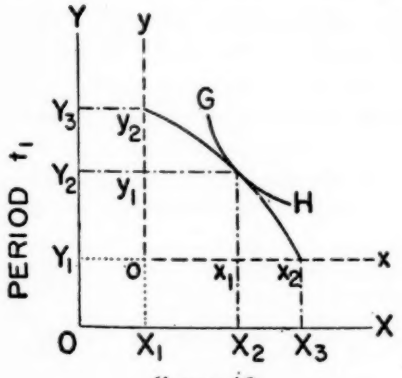


figure 10

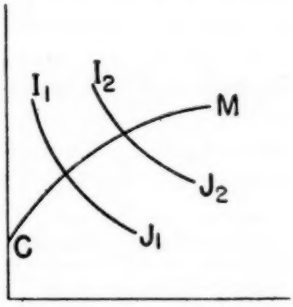


figure 11

PERIOD t_2

oy and *ox* axes and any of the geometric figures which fall within these). The point *o* represents the availability of the flow-derived joint products (fixed proportions) in the period t_1 and t_2. Only one intertemporal combination of products, OY_1 in t_1 and OX_1 in t_2, is possible. Irrespective of the slope of the indifference curve (the marginal rates at which consumption goods substitute for each other between the two time periods), consumption must be at these rates for the reasons previously outlined. *Finally*, the products derived from stock resources can be added to those derived from flow resources. In reference to the OY and OX axes, the maximum supply of products available in period t_1 is then OY_1 flow-derived plus Y_1Y_3 (equals oy_2) stock-derived product for a combined total of OY_3. Similarly, the maximum supply possible in t_2 is OX_1 flow-derived plus X_1X_3 (equals ox_2) stock-derived for a total of OX_3. The composite intertemporal transformation curve is now $Y_3y_2x_2X_3$. The extreme consumption opportunities are (1) OY_3 (equals X_1y_2) product in t_1 and OX_1 in t_2 or (2) OX_3 (equals Y_1x_2) in t_2 and OY_1 in t_1. Any intertemporal combination (indicated on the transformation curve) between these extremes is possible, but it will always include a flow-derived component of OY_1 in t_1 and OX_1 in t_2 if welfare is to be maximized.

What rate of consumption of (1) total product and (2) stock-derived product in each time period will maximize intertemporal welfare when flow and stock resources are considered jointly? Let *GH* (relative to the OY and OX axes) indicate the intertemporal substitution rates for consumption goods. Thus we assume no change in the marginal intertemporal rates of substitution of consumption goods, but *GH* now represents a greater total utility (than in previous employment of *GH* relative to the *ox* and *oy* axes for stock-derived products alone). Maximum intertemporal welfare is again indicated in Figure 10 by tangency of *GH* and $Y_3y_2x_2X_3$ denoting a total consumption in t_1 of OY_2 composed of OY_1 flow-derived and Y_1Y_2 $(=y_1y_2)$.[13] Given identical slopes of the indifference curves, the level of consumption of stock-derived products

[13] Consumption of flow-derived products will never be less than OY_1 in t_1 and OX_1 in t_2 since any indifference curve regardless of its slope (or the discount of future goods) which intersects the Y_3y_2 or Y_2y_3 portion of the intertemporal transformation curve $Y_3y_2x_2X_3$ indicates a smaller total utility than is possible. Any indifference curve which does not represent a complete discount of either t_1 or t_2 goods could only intersect (could not be tangent with) these portions of the transformation curve.

in any time period will be the same regardless of the supply of stock-derived products. The level of conservation of stock resources will be the same in Figure 10 regardless of whether the "annual" stream of flow-derived products is zero or OY_1 $(=OX_1)$.[14]

Substitution of Flow and Stock Resource Services

Previous discussion has assumed that the basic stocks of resources (which serve as raw materials from which products are derived) were the limiting factors in production. The quantity of capital and labor available for transforming (basic stock and flow) resource services was considered great enough to allow an output of flow-derived plus stock-derived products in t_1 or t_2 indicated by the transformation curve $Y_3y_2x_2X_3$. The transformation curve represents the totality of opportunities including limitations of labor supply and the basic resources from which either working capital might be fashioned or consumption goods derived. Now suppose that the quantity of working capital and labor is limited to the extent that attainment of the combined (flow-derived plus stock-derived) output indicated by $Y_3y_2x_2X_3$ is impossible in the relevant total period. Suppose, for example, that if the output of flow-derived product is $OY_1(OX_1)$ in $t_1(t_2)$, the limited supply of "working" capital and labor restricts output of stock-derived products to less than $Y_1Y_2(x_1x_2)$. The supply of basic (flow and stock) resources or raw material is not then the limiting factor in maximizing welfare over the total time span $T(=t_1+t_2)$. Instead, the limiting factor is the supply of "working" labor and capital. Timing of production is not then a central problem in maximizing welfare in the total time span (T). The crucial problem is the extent to which the given

[14] An added alternative is that the slope of the intertemporal indifference curve does change (changes in tastes or utility surfaces still absent), the greater is the total of goods available or utility possible (and hence the higher the indifference contour that can be attained on the total utility surface). If moving to an indifference curve higher on the total utility surface has the effect of increasing the rate at which future goods (t_2) substitute for present goods (t_1) (increases the slope of the indifference curve toward the t_2 axis), a form of substitution will take place when the supply of flow-derived products are added to the fund of stock-derived products. The higher utility contour will be attained by increasing consumption of flow-derived products and decreasing consumption of stock-derived products in period t_1 (since an indifference curve of greater slope than GH in Figure 10 would be tangent to the y_2x_2 portion of the combined transformation curve at a consumption in t_1 indicative of less than ox_1 stock-derived products). It follows that an increase in the absolute quantity of stock-derived products would thus be conserved for consumption in t_2. The same qualification applies to earlier analyses of stock-derived products and size of two populations.

stock of labor and capital should be allocated to production of stock-derived as compared to flow-derived product in any single period (t_1 or t_2). The solution lies, of course, in equating the marginal productivities of labor and capital when allocated between the two alternatives of flow-derived and stock-derived products.

An important substitution problem arises out of dynamics and anticipation.[15] The possibility always exists that a society will be called to draw heavily and rapidly upon its resources in case of future emergency. Availability of resource services which can be converted to "product" in a short-time span is thus important. Conversion of the given stream of flow services cannot be speeded rapidly. Hence a premium may be placed on retaining (building up) a storage of stock resources (services) which can be converted to "product" on short notice. This may be accomplished by substituting flow for stock resource services in production of current consumption goods. A sacrifice or a cost thus occurs in the present if the "working" capital and labor employed in converting the raw materials into product has a lower productivity, if the source is flow rather than stock resources. The loss in welfare is also for all time should the eventuality fail to be realized. However, the cost is one of flexibility and is not only consistent with (1) an *ex post* maximization of welfare if the eventuality occurs, but also with (2) an *ex ante* anticipation of welfare maximization even if the eventuality does not occur.

Intrageneration Welfare

Reference thus far has been to a community indifference curve. However, intertemporal welfare can be maximized only if certain conditions hold both between (1) individuals in the same generation and (2) individuals of discrete generations. For a single generation the marginal rates of substitution among goods of different time periods must be equal for every possible pair of individuals of a single generation. The condition of maximization can be illustrated

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[15] Actually, the real problems of conservation lie in the field of dynamics and anticipations. Our analysis, like that of others (Reder, *Studies in the Theory of Welfare Economics*, Columbia University Press, New York, 1947, pp. 33–34) oversimplifies the problem by reducing time to static treatment of variables. Anticipations, the important framework within which decisions must be made, are hardly considered. Until we have a more nearly adequate set of dynamic tools, the important problems of conservation will go unsolved.

in the conventional manner.[16] Too, if welfare is to be maximized over eternity, the intertemporal marginal rates of substitution must be equal between persons of different generations. While cardinal measures of utility are impossible in all cases, individuals within a single generation can express their relative values in some "approximate manner" by voting through the pricing system or the balloting system. However, it is not only true that measurement of utility is impossible between generations but individuals of future generations have no means of expressing their relative values. Thus economics can say no more than this: *The optimum rate of resource conservation (use) over time is exactly what each succeeding generation believes it to be.* It may be true that if this generation is "spendthrift" and "squanders" resources, a future generation must have its welfare lowered. However, it is impossible to say (because of the complete inability of interpersonal as well as intergeneration utility comparisons) that X quantity resources conserved from generation G_{20} to generation G_{100} would give greater utility to persons of the latter generation. Or, if individuals of G_{20} are misers and "conserve extremely," it is impossible to say that individuals of G_{100} gain more than is lost in utility by G_{20}.[17]

[16] The optimum can be defined (with proper interpretation of the relationships and ordinates) in Figure 6 if G_1H_1 is taken as the indifference curve of individual A and Y_2X_2 represents the (observed) indifference curve of B (relative to the $O'Y'$ and $O'X'$ axes). Here tangency of the two expresses the optimum rate (equation of intertemporal rates of substitution between individuals) at which products should be consumed by both individuals in t_1 and t_2. Individual A should consume OY_2 product in t_1 and OX_1 in t_2. Individual B should consume $O'Y'$ in t_1 and $O'X'$ in t_2.

[17] If individuals of G_{20} consider individuals in G_{100} in formulating their intertemporal marginal rates of substitution, then it can be said that people of one generation are made "better off" and those of another generation are not made "worse off" by the "higher rates" of conservation and hence that welfare "over all time" has been increased through "greater" conservation. Where an early generation would be "worse off" and a later generation would be "better off" through increased conservation, a lower rate of resource use in "current periods" would always increase welfare if the sacrificing generation could be "compensated" in an amount equal to their "loss." However, given full employment, this *compensation* would require exactly the additional resources to be conserved.

PROCEEDINGS OF EXECUTIVE COMMITTEE MEETING, AMERICAN FARM ECONOMIC ASSOCIATION, MONTREAT, NORTH CAROLINA, AUGUST 28, 1950

President Waite called the meeting to order at 8:30 A.M. Members present were: Warren C. Waite, Joseph Ackerman, Walter Wilcox, Oris Wells, Asher Hobson, J. Coke (representing Mr. Van Vliet, President of the CAES), and L. H. Simerl.

At this meeting Asher Hobson completed his term by attending his 19th consecutive annual Executive Committee meeting.

Joseph Ackerman was appointed to prepare resolutions expressing the Association's appreciation to the Montreat Association and the committee on local arrangements and our gratification over the presence of venerable members.

The President was authorized to negotiate with the Blakiston Company for a reprinting of the book, "Readings in Agricultural Policy."

It was agreed to recommend to the next Executive Committee that the Association publish a volume on marketing.

Wilcox recommended that future selections of the Best Journal Article Award be made by the Special Awards Committee.

The Editor was directed to follow the practice of last year and keep the proceedings issue as near 400 pages as possible.

Mr. Coke issued an invitation on behalf of the CAES and the Ontario Agricultural College to the AFEA to hold its 1951 annual meeting on the college campus at Guelph, Ontario, July 24–27.

The need for clarification of relations with student sections and for greater continuity in programs for them was discussed.

The meeting adjourned at 10:30 A.M.

Respectfully submitted,
L. H. SIMERL, *Secretary-Treasurer*

MINUTES OF THE ANNUAL BUSINESS MEETING, AMERICAN FARM ECONOMIC ASSOCIATION, MONTREAT, NORTH CAROLINA, AUGUST 30, 1950

President Waite called the meeting to order at 8:30 A.M. He mentioned that Asher Hobson had completed his term by attending his 19th consecutive annual Executive Committee meeting. He then presented the President's report.

Mr. J. Coke of the Canadian Agricultural Economics Society invited the Association to hold its 1951 annual meeting at the Ontario Agricultural College at Guelph, Ontario, from July 24 to 28.

Reports were made by the Editor, the Secretary-Treasurer, and the Auditing Committee. These reports, and also the President's report, are appended.

The Marketing Committee made the following report.

REPORT OF THE MARKETING COMMITTEE

A joint program was arranged with the American Marketing Association and presented before that group December 28, 1949, at the Waldorf-Astoria Hotel, New York. The papers dealing with the general subject of research on consumer preference study were excellent but attendance was disappointing, somewhere between 50 and 70 being present.

Current attention by the committee, in cooperation with the Agricultural Marketing Committee of the American Marketing Association, is being given to ways of encouraging closer working relationships between groups doing research and teaching in general marketing and agricultural marketing within the same universities.

Respectfully submitted,
M. C. BOND
D. B. DELOACH
AUBREY J. BROWN, *Chairman*

The following resolutions were adopted:

"RESOLVED: That the American Farm Economic Association expresses its sincere appreciation to the Montreat Association and to all those in control of policy at Montreat for making available to us facilities which have served our needs so well during our meeting.

"RESOLVED: That we express our appreciation to Dr. and Mrs. G. W. Forster and to the respective members of their local arrangement committee for the judgment they have exercised, the hospitality they have shown, and the time and energy they have expended over a long period of time in making the necessary local arrangements.

"RESOLVED further: That we express our gratification in having with us Henry Charles Taylor and Benjamin Horace Hibbard, who coming with their families—the former residing at Indian Queen on the Potomac and the latter from Madison, Wisconsin—have shown their characteristic

vigor in the fine fellowship and good spirit that has been evidenced by all from this continent and beyond who have gathered at these meetings."

The following report was received.

REPORT OF THE ELECTION TELLERS

The undersigned, having been duly appointed as election tellers by President Warren Waite, counted the 734 ballots turned over to them by the Secretary-Treasurer of the American Farm Economic Association, and hereby certify that the following individuals have been elected for the year 1950–51:

President, F. F. Hill
President-Elect, G. H. Aull
First Vice-President, G. S. Shepherd
Second Vice-President, R. W. Bressler, Jr.
Secretary-Treasurer, L. H. Simerl

Respectfully submitted,
E. L. BUTZ
A. J. BROWN

President Waite discussed the possibility of the Association joining with the Blakiston Company in the publication of another book. The members present indicated that their sentiment was that marketing would be a fitting subject for such a publication.

H. C. M. Case invited the Association to hold its 1952 annual meeting at the University of Illinois.

O. B. Jessness reported that the meeting of the International Conference of Agricultural Economists might be held at Michigan State College and that there was some feeling on the part of members of the Conference that the AFEA meeting should not be held consecutively with the Conference.

Earl Butz invited the Association to meet at Purdue University in 1952.

Mr. Benedict spoke in favor of holding some future annual meetings with the American Economic Association and allied organizations during the Christmas holidays. The year 1952 would be a logical time to hold the annual meeting. Dr. Shultz supported this suggestion.

O. V. Wells spoke in favor of continuing summer meetings saying that young men asked to give papers in sectional meetings would be lost in the bigger meeting. This statement brought evidence of popular approval. H. C. Taylor spoke in favor of a summer meeting. Asher Hobson stated that he broke with the tradition of winter meetings as a matter of necessity but noted that attendance had been increased since the change had been made. H. C. M. Case suggested that future annual meeting programs include some papers by outstanding economists and others in related fields. T. K. Cowden renewed his invitation to have the Association meet at Michigan State College in 1952.

The meeting adjourned at 10:00 A.M.

Respectfully submitted,
L. H. SIMERL, *Secretary-Treasurer*

REPORT OF THE PRESIDENT

Many persons have devoted time and thought to the affairs of the Association during the past year. In addition to the Secretary-Treasurer and the Editor who always carry a heavy burden, two men have rendered such distinguished service that they deserve special mention. They are Joseph Ackerman and Dean E. C. Young. Mr. Ackerman as first vice-president automatically became responsible for the relations between the Association and the student chapters. He has worked understandingly and diligently on this problem. In this he has been assisted by Earl Butz and Bushrod Allin. We were fortunate in having a man whose duties brought him into contact with many institutions and in the course of the year he talked with numerous student groups in seeking their views and in making arrangements mutually satisfactory to them and to the Association. There are still unsolved problems in these relationships but I think we have made substantial progress on them during the course of the year. The larger student participation in our program this year is evidence of our continuing interest. A problem remains of the development of some greater continuity of relationships with these student chapters. Butz, Allin and Ackerman have each had the problem successively dumped on their laps without previous experience with it. Our relationships are not sufficiently well established nor growth reached a point where it can survive a year under an uninterested vice-president. Even though he has a considerable interest lack of previous contact handicaps the new man. We should develop some greater continuity in handling these affairs.

Dr. E. C. Young has administered the first year of the granting of the awards for meritorious research in the field of agricultural economics. This has been no small task as he and the thirteen men who have assisted him in this effort are well able to testify. They have spent many hours and much thought in making the selections. Perhaps if some had known how much time they would devote to the project they would have refused to serve. It is a high compliment to the interest in and the good-will toward the Association that of the people asked to do these tasks that there was only one who refused. In the carrying out of this project there has been a great deal of experience gained by the group. Certain ideas with respect to classification have developed and score cards or methods of rating have been devised. It would be unfortunate not to capitalize on this experience. A perpetual body of judges would be unwise both because of prejudices and because judging removes possible contestants from the field. For the second year, however, the incoming officers might well consider asking the committee or a considerable portion of it to serve another year.

I am happy to report that the project which was undertaken with the Blakiston Company of pubishing a book on "Readings on Agricultural Policy" has been a success. As of June 30, 1950, 1,868 copies of the book had been sold. This has been sufficient to cover the costs of the edition. About 850 copies remain to be sold, and from these it is expected that the Association will receive about $900 as its share of the profits. A second

printing is now being prepared and the Company is receptive to suggestions for another publishing venture with the Association. We should extend our congratulations and our thanks to W. G. Murray and Asher Hobson who were instrumental in negotiating the contract and to O. B. Jesness and his associated editors for the excellent results. The incoming officers may well consider a second venture in this field.

We will hold joint sessions with the American Statistical Association, American Economic Association and the Econometric Society at their annual meetings in Chicago, December 26 to 30, 1950. In the program of the American Statistical Association two meetings on agricultural statistics have been arranged by R. L. Gillett, and there will also be three sessions on variance analysis and sampling theory that we will sponsor jointly with them. Three joint sessions with the American Economic Association are proposed and one joint session with the Econometric Society. At these sessions the papers and the discussants are all or nearly all members of our Association. Our participation will be substantial even though this does not constitute a regular meeting of the Association.

Finances are still a major problem of the Association. As you are well aware, we operated within our income and built a substantial reserve over a period of many years. This was possible because the institutions at which the office of the Secretary-Treasurer, the editorship of the JOURNAL and the office of President were located contributed clerical and other assistance without change. In the last few years costs of printing the JOURNAL have risen and the duties of the Secretary-Treasurer have increased because of our larger membership. We have sought to pay more of our way by authorizing larger, even though as yet inadequate, appropriations for these offices.

The Secretary-Treasurer's report for the year ending November 30, 1949, which was printed in the May 1950 JOURNAL, however, shocked us all. This is the first time, at least since 1932, that the books of the Association have shown a loss from operations. The deficit for the year from operations amounted to about $3,000. The income from dividends and interest on the reserves of the Association reduced this to $1,224. This situation has been further alleviated through the generosity of the University of Illinois. The Secretary-Treasurer carries in this report an accrued charge for clerical services of $800 incurred by his office. Professor Case has indicated that he will not present this particular bill. We are deeply grateful for this. It is obvious, however, that this would be a poor way for a continuous conduct of affairs by either party. It is probable that dues collected during the year ending November 30, 1950 will be somewhat above those reported for the year ending November 30, 1949. Examination of the Treasurer's reports will show a larger than usual collection of dues in 1948 for peculiar reasons connected with the time of their collection. A somewhat smaller collection occurred in 1949 as a result. But even this will not solve the issues. The plain fact is that unless we adjust our operations or revert to some subsidization we will find ourselves drawing upon reserves.

We have three alternatives, first, to continue to run a deficit, second, to curtail expenses, and third, to increase our income. I consider the first

poor policy unless for a clearly temporary situation. Income may be increased through increased membership or perhaps by raising dues. Increasing membership is evidently the neatest solution. It has been recommended by several recent retiring presidents, and I continue to make the recommendation. The principal criticism to be made of the closing administration is its failure to pursue a vigorous membership campaign. For this I must accept full responsibility. For a number of years I have sat in Executive Committee meetings as Editor listening to dire predictions by the Treasurer of deficits, and yet somehow when he presented his reports there was always a net balance. For this reason I missed what was happening until I received the Secretary-Treasurer's report last February, and by the time we had discovered the reasons it appeared a little late to organize a drive for membership through the present officers. I recommend to the incoming officers that they proceed at once and vigorously in this direction.

If we look for a solution by curtailing expenses the only feasible way is to return to the old basis of subsidization of the office of Secretary-Treasurer and the editor by the institutions where they are located. There are probably institutions and men who can be found who will do this. These tasks have, however, become much more sizable than in the early days of the Association and those who perform them should be assisted and compensated as completely as we are able. The Association is sufficiently important so that it should be supported by the membership carrying the full cost, rather than by being subsidized by a few people who realize its importance.

WARREN C. WAITE, *President*

REPORT OF THE EDITOR

There has been no change in the editorial policies during the past year. The Executive Committee directed the editor to limit the JOURNAL to as near 400 pages as possible in the proceedings issue and 800 pages in the four regular issues during the year. This is the policy now in operation and it requires sharp reductions in the discussions and some shortening of the papers presented at the annual meetings.

The editor has received a larger number of manuscripts in recent months than usual and now has on hand more articles than can be published in the next issue. We try to print almost as many notes as articles in each issue. Younger members of the Association should be encouraged to submit their better papers for publication either as articles or notes in the JOURNAL.

WALTER W. WILCOX, *Editor*

REPORT OF THE SECRETARY-TREASURER

This report covers a period of seven months. This short fiscal period is the result of changing the closing date for the fiscal year from November 30 to June 30. The report for the year ending November 30, 1949 is printed in the May 1950 issue of the JOURNAL.

Membership. As of June 30, the Association had 1,984 members and sub-

scribers to the JOURNAL. This is a decrease of 51 since November 30, 1949.

SUMMARY OF MEMBERSHIP AND SUBSCRIPTIONS

	Nov. 30, 1949	Additions	Cancellations	June 30, 1950	Net change
Individual members	1,325	55	101	1,279	−46
Junior members	159	44	43	160	+ 1
U. S. libraries and firms	321	19	27	313	− 8
Foreign libraries and firms	219	31	30	220	+ 1
Exchanges	11	1	0	12	+ 1
Total	2,035	150	201	1,984	−51

We are in need of a good membership campaign. An organization must have a constant acquisition program in order to offset inevitable losses. During the past seven months, we have lost 101 regular members by cancellation. We have received only 55 new members, and thus have had a net decrease of 46. We have 160 Junior members, one more than on November 30 last year.

We have a net decrease of seven U. S. libraries and firms, and a total of 314. We have 220 foreign libraries and firms, one more than at the previous report.

Heads of departments of agricultural economics in colleges and universities are in an excellent position to help increase membership in the Association. A few heads have rendered excellent service to the Association and to their staff members by encouraging them to become members. Some heads have also been very effective in getting a large share of their graduate students to become Junior members.

Likewise, heads of certain divisions of the USDA and other government and private agencies can be very helpful in securing additional members.

Perhaps we should have a special committee of 100 to work on the problem of membership acquisition and maintenance. This committee might include those who head various departments and divisions in colleges, government agencies and private organizations or persons suggested by them.

A substantial number of persons ask to become members each year. Many more will join the Association if they are given basic facts about the Association and a sincere invitation to become members.

Heretofore, membership years have not been uniform. Some began January 1 and others with each of the other three quarters. This arrangement required a great deal of hand work and caused much confusion among joint members with the Western Farm Economics Association where all memberships are on a calendar-year basis. Adjusting all AFEA memberships to a calendar-year basis will reduce costs of sending out notices and reduce confusion among the joint members.

INCOME AND EXPENSE STATEMENT
DECEMBER 1, 1949 TO JUNE 30, 1950

Operating income		
Dues and subscriptions	$ 7,172.59	
Back numbers sold	406.52	
Reprints sold	58.35	
Advertising sold	75.00	
Proceedings for WFEA	323.70	
Miscellaneous	139.61	$ 8,175.77
Operating expenses		
JOURNAL printing		
Two issues	$ 6,561.86	
Reprints, etc.	507.49	7,069.35
Other expenses		
Back numbers purchased	$ 106.00	
Office supplies	142.42	
Postage and wires	68.45	
Editorial expense	586.84	
Secretary-Treasurer expense (clerical)	875.00	
Miscellaneous	150.13	1,928.84
Total expenses		$ 8,998.19
Operating loss		822.42
Dividends and interest		1,479.67
Net gain or loss		+657.25

FINANCIAL STATEMENT
JUNE 30, 1950

Assets		
Cash in bank	$ 7,905.62	
Interest coupons	237.50	
Stocks	20,209.75	
U. S. government securities	43,980.00	72,332.87
Liabilities		
Special Grants Fund	$14,576.07	
Accrued expense (clerical)	875.00	15,451.07
Net worth		$56,881.80

ADJUSTMENTS IN NET WORTH

Net worth December 1, 1949	$54,716.87	
Transfer to Special Grants Fund	151.07	54,565.80
Add		
Net gain	$ 657.25	
Appreciation stocks	848.75	
Appreciation bonds	10.00	
Cancelled liability	800.00	2,316.00
Net worth June 30, 1950		$56,881.80

Finances. Previous fiscal years have closed November 30. This report covers a period of seven months ending June 30, 1950. The Executive Committee ordered the change in fiscal years so that annual reports will be available in time for summer annual meetings.

During the period under review, the net worth of the Association increased by $2,164.93. This increase originated as follows: cancellation of liability to the University of Illinois for clerical services, $800.00; appreciation of stocks and bonds, $858.75; and dividends and interest from investments, $506.18.

Operating expenses totalled $8,998.19, and exceeded operating income by $822.42. This deficit was more than made up by the $1,479.67 received as dividends and interest on investments.

Principal item of expense was the printing of the JOURNAL OF FARM ECONOMICS. This made up 78 percent of the total expenditures. Printing costs seem likely to increase during the next year.

Respectfully submitted,
L. H. SIMERL, *Secretary-Treasurer*
August 11, 1950

REPORT OF AUDITORS

At the request of the President of the American Farm Economic Association, we have examined the accounts of the Secretary-Treasurer, L. H. Simerl, for the period, December 1, 1949 through June 30, 1950. We have verified the assets and liabilities shown in his financial statement as of June 30, 1950.

We have checked all disbursements against canceled checks and the totals of each deposit slip against bank statements; income and expense items have been traced to their individual accounts, and the total of each account has been verified.

We have checked the treasurer's report of income and expenses and the financial statement for the periods indicated, and have found that they accurately reflect the transactions and financial position of the Association as shown by his records.

Respectfully submitted,
L. J. NORTON
R. J. MUTTI, *Auditors*

PROCEEDINGS OF EXECUTIVE COMMITTEE MEETING, AMERICAN FARM ECONOMIC ASSOCIATION, MONTREAT, NORTH CAROLINA, AUGUST 30, 1950

President F. F. Hill called the meeting to order at 10:30 A.M. Members present were: H. E. Erdman, representing the President of the WFEA, George Aull, O. V. Wells, Warren Waite, Walter Wilcox, Geoffrey Shepherd, J. Coke, representing the President of the CAES, and L. H. Simerl.

Walter Wilcox was appointed Editor of the JOURNAL OF FARM ECONOMICS for the ensuing year.

It was agreed that the invitation from the Canadian Agricultural Economics Society and the Ontario Agricultural College to hold the 1951 annual meeting on the OAC campus at Guelph be accepted. The dates for the meeting will be July 24–27. The President was authorized to go to Guelph at Association expense to make arrangements for the meeting.

In order to furnish transfer officers of corporations with the necessary evidence that the Secretary-Treasurer is authorized to transfer securities in the name of the Association, the following resolution was adopted.

"RESOLVED, that the Secretary-Treasurer (L. H. Simerl of Urbana, Illinois) who is also Chairman of the Investment Policy Committee, be and is hereby authorized and empowered, for, and in the name and on behalf of this Association to take any and all such steps, and to do any and all such things, as may be necessary, required, and appropriate for, or in connection with, the purchase, acquisition, acceptance, handling, pledging, sale, or other disposition of stocks, bonds, and other securities belonging to the Association or pertaining to its business, including the execution, and delivery for and in the name and on behalf of the Association, of any and all endorsements, transfer and assignments of certificates of stock, bonds, or other securities standing in the name of this Association, either for the purpose of sale or transfer, and all such other steps and action as may be necessary or proper in connection herewith."

In order to comply with a request of the bonding company, the following resolution was adopted.

"The securities belonging to the American Farm Economic Association shall be kept in a safe deposit box, and the same shall be opened only by L. H. Simerl, Secretary-Treasurer and L. J. Norton, jointly."

The Secretary-Treasurer reported on the holdings of cash and securities belonging to the Association.

The Committee suggested to the President that Dean E. C. Young be asked to continue for another year as chairman of the Special Awards Committee.

The President was authorized to continue the awards program for another year on approximately the same basis as the past year or to increase the total amount of funds of awards to $1,500 by making six equal awards.

It was agreed that any article published in the JOURNAL would be eligible

for the Best Article Award. Publication in the JOURNAL or selection as the Best Article shall not make any paper ineligible for the Special Awards. The Committee on Special Awards will also select the best article in the JOURNAL. This award shall not be limited to men under 40 years of age.

President Hill was instructed to ask Joe Ackerman to continue the work with the student sections.

The President was authorized to appoint an editor or a committee to develop material for a book of marketing readings. He also was authorized to enter into a contract with the Blakiston Company for the publication of such a book.

Respectfully submitted,
L. H. SIMERL, *Secretary-Treasurer*

INDEX TO VOLUME XXXII

1950

SUBJECTS

Adjustment problems in midwest agriculture, 788
  Discussion, 799
Agricultural ladder, what has happened to the, 30
Agricultural policy
  Coming developments in agricultural policy, 827
  Development of agricultural policy, 839
  Discussion, 856
  Our agricultural and trade policies, 159
Agricultural production, measuring the volume of, 604
Agricultural statistics
  As an aid to research, service, and administration, 858
  Current frontiers in farm price data, 865
  Discussion, 877, 879
Agriculture adjustments
  Adjustment problems in midwest agriculture, 788
  Discussion, 799
  Dynamics of farm adjustments in the South, 721
  Over-all adjustment in southern agriculture, 773
  Discussion, 786
Agriculture and industry, the machine process in, 69
Agriculture and the conditions of postwar trading, 814
Agriculture and world trade
  See World trade
Agriculture programs, developments and prospects in the European Recovery Program, 541
Agriculture, United States politics of, 571
Application of recent economic theory in agricultural production economics, 1125
  Discussion, 1156
Application of static economic theory to farm management problems, 1100
  Discussion, 1120, 1121, 1122
Appraisal of landlord-tenant relationship program, 1093

Bases of adjusting international trade in foodstuffs, 445

Central market quotations and country buying, 975
  Discussion, 988
Coming developments in agricultural policy, 827
  Discussion, 856
Commodity Credit Corporation
  Impact of CCC operations on farm market prices and market channels, 931
  Impact of CCC operations upon marketing agencies, 943
  Discussion, 1015, 1016
Conservation and utilization of resources, United Nations Scientific Conference on, 95
Conservation economics and policy, some fundamentals, 1182
Cooperative expansion through horizontal integration, 1031
  Discussion, 1058, 1060, 1062
Cooperatives
  Trends in cooperative expansion, 1019
  Cooperative expansion through horizontal integration, 1031
  Vertical integration of agricultural cooperatives, 1048
  Discussion, 1058, 1060, 1062
  Marketing agreements and cooperative marketing, some comparative aspects, 216
Cotton
  Cotton, planning in, 48
  Cotton price policy in relation to the domestic market, 738
  Cotton labor requirements, 752
  World prospects in cotton, 759
  Discussion, 770
Current frontiers in farm price data, 865
  Discussion, 877, 879

Dairy Farm Management Project, New England: an example of the operating unit approach to farm management analysis, 201
Demand and supply, short run, in the hog market, 624
Development of agricultural policy, 839
  Discussion, 856
Dynamics of farm adjustments in the South, 721
  Discussion, 735, 736

Economic changes in food manufacturing, 584
Economic prospects of the South, 709
Discussion, 735, 736
Economic theory, applied to farm management
Application of static economic theory to farm management problems, 1100
Limitations of static economic theory to farm management analysis, 1113
Discussion, 1120, 1121, 1122
Application of recent economic theory in agricultural production economics, 1125
Needed developments in economic theory as applied to farm management, 1140
Discussion, 1156
Relation of economic theory to the analysis of empirical data in farm management research, 1169
Some problems of joint use of theory and empirical data in farm management research, 1169
Economics of land classification for irrigation, 553
Establishing grades for farm products, problems in, 15
European Recovery Program; programs, developments, and prospects in agriculture, 541
Extension methods used in Landlord-tenant Relationship Program, 1076

Farm housing in the United States and recent farm housing legislation, 590
Farm Management
Application of economic theory to farm management. *See* Economic Theory.
New England Dairy Farm Management Project as an example of the operating unit approach to farm management analysis, 201
Farmers' adaptations to income uncertainty, 356
Federal Food and Drug Administration, influence of, in marketing, 969
Food manufacturing, some economic changes in, 584
Foodstuffs, bases of adjusting international trade in, 445

Government programs in tobacco, 894
Grades for farm products, problems in establishing, 15

Hog market, short run demand and supply in the, 624
How the Landlord-tenant Relationship Program was started; objectives, situations, and difficulties encountered, 1080

Impact of Commodity Credit Corporation operations on farm market prices and market channels, 931
Impact of Commodity Credit Corporation operations on marketing agencies, 943
Discussion, 954, 955
Impact of marketing agreements and orders on marketing of milk, 992
Impact of marketing agreements upon marketing of fruits and vegetables, 1006
Discussion, 1015, 1016
Influence of the Federal Food and Drug Administration in marketing, 969
Institutional methods of meeting weather uncertainty in the Great Plains, 391
International trade—*See* World trade
International trade in foodstuffs, bases of adjusting, 445
Irrigation, the economics of land classification for land and water programs in the Northern Great Plains, 431
Land and water development programs in the Northern Great Plains, 431

Knowledge for what in the Northern Great Plains; a symposium, 353
Farmers' adaptations to income uncertainty, 356
Stabilizing farming by shifting wheatland to grass in the Northern Great Plains, 375
Institutional methods of meeting weather uncertainty in the Great Plains, 391
Space as a social cost, 411
Land and water development programs in the Northern Great Plains, 431

Labor requirements, cotton, 752
Land and water development programs in the Northern Great Plains, 431
Land classification for irrigation, the economics of, 553
Land economics research, in retrospect and prospect, 1064
Landlord-tenant Relationship Program in North Carolina, 1076
Background, 1076
Objectives, situations, difficulties encountered in starting, 1080

Extension methods used, 1087
Progress by participating croppers, 1090
Appraisal, 1093
Discussion, 1099
Latin America, problems of landownership in, 258
Legislation, recent farm housing, 590
Limitations of static economic theory in farm management analysis, 1113
Discussion, 1120, 1121, 1122
Los Angeles and San Francisco milksheds milkers' unions, 458

Machine process in agriculture and industry, 69
Marketing
Central market quotations and country buying, 975
Discussion, 988
Impact of Commodity Credit Corporation operations on farm market prices and market channels, 931
Impact of Commodity Credit Corporation operations on marketing agencies, 943
Discussion, 954, 955
Impact of marketing agreements and orders on milk marketing, 992
Impact of marketing agreements upon the marketing of fruits and vegetables, 1006
Discussion, 1015, 1016
Influence of Federal Food and Drug Administration in marketing, 969
Market relationship and resource allocation, uncertainty of, in the short run, 240
Marketing agreements and cooperative marketing: some comparative aspects, 216
Role of market news in marketing and some problems, 958
Discussion, 988
Measuring the volume of agricultural production, 604
Milkers' unions of the San Francisco and Los Angeles milksheds; an inquiry into modern industrialized dairying and collective bargaining in agriculture, 458
Midwest agriculture, adjustment problems in, 788
Discussion, 799
Milk marketing, impact of marketing agreements and orders on, 992
Discussion, 1015, 1016

Needed developments in economic theory as applied to farm management, 1140
Discussion, 1156
New England Dairy Farm Management Project as an example of the operating unit approach to farm management analysis, 201
North Carolina, landlord-tenant relationship program, 1076. *See* Landlord-tenant, etc.
Northern Great Plains, knowledge for what, in the: a symposium, 353. *See* Knowledge, etc.

Operating unit approach to farm management analysis, New England Dairy Farm Management Project as an example, 201
Our agricultural and trade policies, 159
Over-all adjustment in southern agriculture, 773
Discussion, 786

Planning in cotton, 48
Politics of agriculture in the United States, 571
Postwar recovery of Western German agriculture, 1
Price variability confronting primary producers, reducing, 176
Problems in establishing grades for farm products, 15
Problems of landownership in Latin America, 258
Procedure for one year of work in Landlord-tenant Relationship Program, 1085
Progress made by croppers in Landlord-tenant Relationship Program, 1090

Reducing price variability confronting primary producers, 176
Discussion, 193, 196, 199
Relation of economic theory to the analysis of empirical data in farm management research, 1159
Resource allocation and market relationship, uncertainty of, in the short run, 240
Role of market news in marketing and some problems, 958
Discussion, 988

San Francisco and Los Angeles milksheds milkers' unions, 458
Short run demand and supply in the hog market, 624
Short run, uncertainty in market relationships and resource allocation in the, 240
Social cost of space in the Northern Great Plains, 411

Some aspects of research in the marketing of tobacco leaf, 907
Discussion, 923, 924
Some economic changes in food manufacturing, 584
Some fundamentals of conservation economics and policy, 1182
Some problems of joint use of theory and empirical data in farm management research, 1169
Southern agriculture
Strategic approaches to southern progress, 697
Economic prospects of the South, 709
Dynamics of farm adjustments in the South, 721
Discussion, 735, 736
Over-all adjustment in southern agriculture, 773
Discussion, 786
Space as a social cost; an approach toward community design in the sparsely populated areas of the Great Plains, 411
Stabilizing farming by shifting wheat land to grass in the Northern Great Plains, 375
Static economic theory
See Economic theory
Strategic approaches to southern progress, 697
Discussion 735, 736

Technological changes and the future of rural life, 225
Tobacco
Trends in the consumption of tobacco products, United States 1900–1950, 881
Some aspects of research in the marketing of tobacco leaf, 907
Government programs in tobacco, 894
Discussion, 923, 924
Trends in the consumption of tobacco products, United States, 1900–1950, 881
Discussion, 923 924
Trends in cooperative expansion, 1900–1950, 1019
Discussion, 1058, 1060, 1062

Uncertainty in market relationships and resource allocation in the short run, 240
Uncertainty of income, farmers' adaptations to, 356
Uncertainty of weather in the Great Plains, Institutional methods of meeting, 391
United Nations Scientific Conference on the conservation and utilization of resources, 95

Vertical integration of agricultural cooperatives, 1048
Discussion, 1058, 1060, 1062

Weather uncertainty in the Great Plains, institutional methods of meeting, 391
Western farm areas in two World Wars, 82
Western German agriculture, postwar recovery of, 1
What has happened to the agricultural ladder? 30
Wheatland shifted to grass to stabilize farming in the Northern Great Plains, 375
World prospects in cotton, 759
Discussion, 770
World trade
World trade and American agriculture, 801
Agriculture and the conditions of postwar trading, 814
World prospects in cotton, 759
Bases of adjusting international trade in foodstuffs, 445
Our agricultural and trade policies, 159

AUTHORS

(Articles are indicated by asterisks)

Allen, Carl W.
Discussion, 786
Anderson, A. H.
*Space as a social cost, 411
Atkinson, L. J.
See Reviews, 334
Aull, G. H.
*United Nations Scientific Conference on the conservation and utilization of resources, 95
*Economic prospects of the South, 709
Austin, R. C.
*Government programs in tobacco, 894

Bachman, Kenneth L.
*Relation of economic theory to the analysis of empirical data in farm management research, 1159
Baker, Ralph L.
See Notes, 658
Barber, E. Lloyd
*Institutional methods of meeting weather uncertainty in the Great Plains, 391
Barlowe, Raleigh
*What has happened to the agricultural ladder? 30
See Reviews, 318, 685
Bierman, Russell W.
See Reviews, 673
Discussion, 735
Black, John D.
*Bases of adjusting international trade in foodstuffs, 445
Bottum, J. Carroll
*Adjustment problems in midwest agriculture, 788
Brandow, G. F.
See Reviews, 511
Brekke, Arnold
*Development of agricultural policy, 839
Brewster, John M.
*The machine process in agriculture and industry, 69
Brownlee, L. H.
* Reducing price variability confronting primary producers, 176
See Reviews, 526
Burkett, W. K.
See Notes, 647
Burton, Gordon L.
See Reviews, 519

Calkins, Robert D.
*Strategic approaches to southern progress, 697
Cochrane, Willard W.
See Reviews, 331
Discussion: impact of CCC on marketing, 955
Cook, Hugh L.
Central market quotations and country buying, 975
Cotton, Walter P.
See Reviews, 528
Cunningham, L. C.
Discussion, Static economic theory applied to farm management, 1121

Darrah, L. B.
See Notes, 652
Dawood, Hassan Aly
See Notes, 489

Elkington, Charles M.
See Reviews, 324
Erdman, H. E.
*Problems in establishing grades for farm products, 15
*Trends in cooperative expansion, 1019
Engene, S. A.
Discussion: Static economic theory applied to farm management, 1120

Farrington, C. C.
*Impact of the Commodity Credit Corporation operations upon marketing agencies, 943
Feder, Ernest
*The milkers' union of the San Francisco and Los Angeles milksheds, 458
Fellows, Irving F.
*The application of static economic theory to farm management problems, 1100

Gabbard, L. P.
*United Nations Scientific Conference on the Conservation and Utilization of Resources, 95
Gage, Charles E.
Discussion: marketing of tobacco, 924
Gaumnitz, E. W.
*The influence of the Federal Food and Drug Administration in marketing, 969

Gay, Leslie N., Jr.
*Problem of landownership in Latin America, 258
Grayson, Paul F.
*Farm housing in the United States and recent farm housing legislation, 590
Greene, R. E. L.
Discussion: Static economic theory applied to farm management, 1122

Halcrow, Harold G.
Discussion: reducing price variability confronting primary producers, 196
See Reviews, 505
Hamilton, H. G.
Discussion: impact of marketing agreements upon the marketing of fruits, vegetables, and milk, 1016
Hannah, H. W.
See Note, 306
Hanson, K. O.
See Note, 134
Hardin, Charles M.
*The politics of agriculture in the United States, 571
Hardin, Lowell S.
See Reviews, 509
Hart, Albert G.
Discussion: reducing price variability confronting primary producers, 199
Haver, C. B.
Discussion: needed developments in economic theory as applied to farm management, 1156
Heady, Earl O.
*Uncertainty in market relationship and resource allocation in the short run, 240
*Application of recent economic theory in agricultural production economics, 1125
*Some fundamentals of conservation economics and policy, 1182
Hedlund, Floyd F.
*The impact of marketing agreements upon the marketing of fruits and vegetables, 1006
Hendrix, Robert L.
*Procedure of Landlord-tenant Program for one year, 1085
Hirsch, Werner Z.
*Marketing agreements and cooperative marketing: some comparative aspects, 216
Discussion: cooperative marketing, 1058
Hoos, Sidney
See Reviews, 326
Horne, M. K., Jr.
*Cotton price policy in relation to the domestic market, 738

Jackson, Elmo H.
*Trends in the consumption of tobacco products, United States, 1900–1950, 881
James, H. B.
*Limitations of static economic theory in farm management research, 1113
Jesness, O. B.
Warren C. Waite, 1896–1950
Johnson, D. Gale
*Reducing price variability confronting primary producers, 176
*Coming developments in agricultural policy, 827
See Note, 123
Johnson, Glenn L.
*Needed developments in economic theory as applied to farm management, 1140
Johnson, Sherman E.
*Technological changes and the future of rural life, 225
See Notes, 485
Jones, Lloyd E.
*Stabilizing farming by shifting wheatland to grass in the Northern Great Plains, 375

Katkoff, V.
See Note, 128
See Reviews, 512
Kearl, C. D.
See Note, 652
Kelso, M. M.
*Knowledge for what in the Great Northern Plains; a symposium, 353
Knapp, Joseph G.
*Cooperative expansion through horizontal integration, 1031
See Reviews, 521
Knight, Frank H.
See Note, 112
Kohls, R. H.
See Notes, 500, 663
Koller, E. Fred
*Vertical integration of agricultural cooperatives, 1048
Krause, Heinz
*Measuring the volume of agricultural production, 604

Lansford, F. L.
*Over-all adjustment in southern agriculture, 773
Lanham, Ben T., Jr.
Discussion: World prospects in cotton, 700

Lewis, Nancy W.
*Extension methods used in Landlord-Tenant Program, 1087
Lindholm, Richard W.
See Note, 150
Long, Erven J.
See Reviews, 676

Martin, Lee R.
*Some aspects of research in the marketing of tobacco leaf, 907
Mathis, A. G.
Discussion: marketing influences, 988
McCallister, Kenneth J.
*The role of market news in marketing and some problems, 958
McMartin, Wallace
*The economics of land classification for irrigation, 553
Mehren, George L.
**See* Reviews, 683
Miley, D. Gray
*Cotton labor requirements, 752
Morales, Julio O.
See Reviews, 680
Muehlbeier, John
*Land and water development programs in the Northern Great Plains, 431

Nelson, Paul E., Jr.
See Note, 313
Nesius, Ernest J.
*Some problems of joint use of theory and empirical data in farm management research, 1169
Nicholls, William H.
See Reviews, 523
Norby, John C.
See Note, 290

O'Donnell, Cyril
*Planning in cotton, 48
Ogdon, Montell
See Reviews, 525
Oser, Jacob
See Note, 666

Paarlberg, Don
Discussion: farm price data, 879
Paiva, Ruy Miller
See Note, 282
Paul, Allen B.
*Some economic changes in food manufacturing, 584
Perregaux, E. A.
Discussion: cooperative marketing, 1060
Powell, J. C.
*Landlord-Tenant Relationship Program in North Carolina, 1076
Proctor, Roy E.
Discussion: farm economics in the South, 736

Rall, Leonard
See Reviews, 145
Ratchford, C. B.
*Appraisal of Landlord-Tenant Relationship Program, 1093
Raup, Philip M.
*Postwar recovery of Western German Agriculture, 1
Reifel, Ben
See Note, 644
Renne, Roland R.
See Reviews, 503
Richter, J. H.
*The European Recovery Program; programs, developments, and prospects in agriculture, 541
Roberts, John B.
Discussion: impact of marketing agreements on the marketing of fruits, vegetables, and milk, 1015
Robotka, Frank
See Reviews, 678
Discussion: cooperative marketing, 1062

Salter, Robert M.
See Note, 478
Saville, R. J.
See Reviews, 506
Sayre, Charles R.
*Dynamics of farm adjustments in the South, 721
Schickele, Rainer
*Farmers' adaptations to income uncertainty, 356
See Reviews, 336
Schmukler, Sidney
See Reviews, 333
Schruben, Luke
Discussion: Landlord-tenant Program, 1099
Shepherd, Geoffrey
See Note, 271
Discussion: impact of CCC on marketing, 954
Sherman, Caroline
See Reviews, 152
Shohan, Charles J.
See Reviews, 515
Southworth, Herman M.
Discussion: marketing influences, 988
Sower, Christopher
See Reviews, 319
Spencer, Leland
*Impact of marketing agreements and

orders on the marketing of milk, 992
Spitze, Robert F.
See Reviews, 516
Stauber, B. R.
*Current frontiers in farm price data, 865
Steele, Harry A.
*Land and water development programs in the Northern Great Plains, 431
Stine, O. C.
*The impact of Commodity Credit Corporation operations on farm market prices and market channels, 931
Stoddard, Charles H.
See Reviews, 340

Taylor, Henry M.
Discussion: farm price data, 877
Thair, Philip J.
*Institutional methods of meeting weather uncertainty in the Great Plains, 391
Timmons, John F.
*What has happened to the agricultural ladder? 30
*United Nations Scientific Conference on the Conservation and Utilization of Resources, 95
See Reviews, 148
Tintner, Gerhard
See Reviews, 531
Tolley, George
*Short run demand and supply in the hog market, 624
Tolley, Howard R.
*World trade and American agriculture, 801
Tootell, R. B.
See Reviews, 329
Turner, W. L.
*Progress made by croppers in Landlord-tenant Relationship Program, 1090

VanLandingham, Eugenia P.
*How the Landlord-tenant Relationship Program in North Carolina was started: objectives, situations, difficulties encountered, 1080

Wallace, Robert F.
*Western farm areas in two World Wars, 82
Walter, George H.
See Note, 277
Ware, Henry W.
See Note, 299
Waugh, Frederick V.
Discussion: reducing price variability confronting primary producers, 193
Discussion: agricultural policy, 856
See Reviews, 321
Welch, Frank J.
*Cotton labor requirements, 752
Wells, Oris V.
*Agricultural statistics as an aid to research, service, and administration, 858
Wheeler, Richard G.
*New England Dairy Farm Management Project as an example of the operating unit approach to farm management analysis, 201
White, E. D.
*World prospects in cotton, 759
Wiecking, E. H.
*Land economics research in retrospect and prospect, 1064
Wilcox, Walter W.
See Note, 310
Wills, J. E.
Discussion: Problems in midwest agriculture, 799
Winter, E. P.
See Note, 138
Witt, Lawrence W.
*Our agricultural and trade policies, 159
*Agriculture and the conditions of postwar trading, 814
Wright, Karl T.
See Reviews, 147

Zaglitz, Oscar
See Note, 495

NOTES

Analysis of waste in marketing; remarks on methodology, 138

Changes in time of starting chicks, 652
Collective farm peasant market, 299
Comment on Professor Parsons' article on logical foundations of economic research, 112
Complementary tools of farm planning, 647
Cooperative and contract use of farm machinery in Norway, 290

Economic aspects of technical progress, 485
Expectation in agricultural credit, 134

Food distribution programs during periods of high level business activity, 310

Market support given certain commodities by the Iowa School Lunch Program, 313

Politics of "basic" crops in farm legislation, 666
Predicting annual egg production in the United States, 658
Price provisions of the Agricultural Act of 1949, 271
Problem of relocating families on the Fort Berthold Indian Reservation, 644

Recent experiences in rehabilitation of stripped lands, 277
Resource efficiency and policy, 123

Scope and methods of agricultural economics in São Paulo, Brazil, 282
Some characteristics of agricultural land leasing in Egypt, 489
Soviet livestock industry, 128
Stanford Food Institute on international commodity stockpiling as an economic stabilizer, 495
Suggested plan for assigning corn acreage allotments to individual farms under present provisions of the Agricultural Adjustment Act of 1938, 306

Teaching undergraduates in Agricultural Economics, 500
Technical progress in agriculture, 478
Technique for anticipating change in the volume of egg storage, 663

REVIEWS

Adams, Walter, editor: *The Structure of American Industry, Some Case Studies*, (George L. Mehren), 683

Bailey, Stephen Kemp: *Congress Makes a Law* (Walter P. Cotton), 528
Brunner, Edmund de S., and Yang, E. Hsin Pao: *Rural America and the Extension Service* (R. B. Tootell), 329

Clark, Andrew Hill: *The Invasion of New Zealand by People, Plants, and Animals* (Gordon L. Burton), 521
Clawson, Marion: *The Western Range Livestock Industry* (Harold G. Halcrow), 505
Cohen, R. L.: *The Economics of Agriculture* (Montell Ogdon), 525
Cox, Reavis, and Alderson, Wroe, editors: *Theory in Marketing* (Sidney Hoos), 326

Davis, John H.: *An Economic Analysis of Tax Status of Farmer Cooperatives* (Frank Robotka), 678
Digby, Margaret: *Horace Plunkett; An Anglo-American Irishman* (Joseph G. Knapp) 521
Dummeier, E. F., Heflebower, R. B., and Norman, Theodore: (*Economics With Application to Agriculture* (G. E. Brandow), 511

Eaton, Allen H.: *Handicrafts of New England* (Caroline Sherman), 152
Efferson, J. Norman: *Farm Records and Accounts* (Karl Wright), 147

Forster, G. W., and Leager, Marc C.: *Elements of Agricultural Economics* (Erven J. Long), 676
Fulmer, John Leonard: *Agricultural Progress in the Cotton Belt Since 1920* (R. J. Saville), 506

Gold, Bela: *Wartime Economic Planning in Agriculture* (Willard B. Cochrane), 331
Goldenweiser, F. A.: *Monetary Management* (Leonard Rall), 145

Hickman, C. Addison: *Our Farm Program and Foreign Trade* (Charles M. Elkinton), 324
Hoagland, Henry E.: *Real Estate Principles* (Sidney Schmukler), 333
Hoffsommer, Harold, editor: *The Social and Economic Significance of Land Tenure in the Southwestern States, A Report of the Regional Land Tenure Research Project* (Russell W. Bierman), 673

International Journal of Agrarian Affairs, International Wheat Agreements (Robert G. F. Spitze), 516

Jasny, Naum: *The Socialized Agriculture of the USSR* (v. Katkoff), 512

Landis, Benson Y.: *Rural Welfare Services* (Christopher Sower), 319

Malone, Carl C.: *How to Make Your Farm Pay* (Lowell S. Hardin), 500

Meade, James E.: *Planning and the Price Mechanism* (Richard W. Sindholm), 150

Mills, Lennox A., and Associates: *The New World of Southeast Asia* (Charles J. Shohan), 515

National Bureau of Economic Research: *Studies in Income and Wealth* (Rainer Schickele), 336

Paiva, Rui Miller: *Garantia de Precos Estaveis e Remuneradores a Agricultura de São Paulo* (William H. Nicholls), 523

Perloff, Harvey S.: *Puerto Rico's Economic Future* (Julio O. Morales), 680

Preston, John F.: *Farm Wood Crops* (Charles H. Stoddard), 340

Raushenbush, Stephen: *Our Conservation Job* (John F. Timmons), 148

Saulnier, R. J.: *Urban Mortgage Lending by Life Insurance Companies* (Raleigh Barlowe), 685

Saunderson, Mont H.: *Western Land and Water Use* (Roland R. Renne), 503

Sayana, V. V.: *The Agrarian Problems of Madras Province* (Raleigh Barlowe), 318

Schultz, Theodore W.: *Production and Welfare of Agriculture* (Frederick V. Waugh), 321

Somers, Harold M.: *Public Finance and National Income* (O. H. Brownlee), 526

Tinbergen, Jan: *The Dynamics of Business Cycles*, translated by J. J. Polak (Gerhard Tintner), 531

Weintraub, Sidney: *Price Theory* (L. J. Atkinson), 334

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